RAILROAD GAZETTE

FRIDAY, JUNE 7.

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Contributions.

The Van Dorston Coupler.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your report of the trial of the Van Dorston coupler it is said that "there was no failure to couple, except on one very sharp curve, said to be of 75 ft. radius." The fact is that this failure to couple was due in no way to the design of the coupler, but to the fact that the dead-blocks on the inner side of the curve met and prevented the couplers coming together. But for the dead-blocks the coupling could have been made on the curve as well as on straight track.

A. W. VAN DORSTON.

Truck Radius, Canadian Pacific Mogul.

JUNE 2, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The radius of the truck of the Canadian Pacific Mogul, illustrated in the *Gazette* of May 31, is 4 ft., the rigid wheel base is 14 ft. 6 in., and the distance from forward drivers to truck wheels is 7 ft. 5½ in. Do you not consider this radius to be rather shorter than is desirable? By the rule I have been successfully using for years, founded on what I believe to be perfectly correct reasoning, this dimension should be about 18 in. greater, yet the engine in question is said to curve freely and steadily. This may seem rather a trivial matter, but I think a little light on the subject in general would be highly appreciated by many who have not the time nor, perhaps, the ability to investigate for themselves. D.

Alloys for Bearing Metals.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am very much amused at a communication from "C" in reference to alloy for bearing metals. The formula which he gives for driving rod brasses would answer very well for the speed attained by rolling stock on steam roads from 25 to 50 years ago; but in the present age, with the progress which has been made in other directions, it surprises me to have such a formula laid down by an experienced, and, I presume, practical man, which he must be, or he would not advocate that which he does.

It is a well-known fact that copper, tin and zinc are anti-frictional up to a certain point in the way of speed and the weight that is put upon them. Of all the soft metals now in use or known to the trade, viz., copper, tin, lead and zinc, there is but one of these metals which is thoroughly anti-frictional. This question has been definitely settled a long time ago, and more particularly in lead-lined brasses, these being used almost exclusively throughout the country, lead being a soft anti-frictional metal, and one that would conform to the old journals. This is the reason that it is supplied for lining in preference to an alloy of lead and antimony, or tin, copper and antimony as a Babbitt metal.

We claim to-day, and have right along, that the founder or smelter who can alloy lead with copper in such percentages as is desirable, is the one who can produce an anti-frictional metal. Of course lead can be carried too far in the composition and you will produce a brittle metal as well as one which would not stand a very high pressure, but if carried to an extent of say from 10 to 20 lbs. of lead to 100 lbs. of alloy made, you can produce a hard, tough, as well as anti-frictional metal; one which will run cool, even with poor oil.

Our attention has been called recently to a large railroad, which has equipped a number of engines with a composition composed largely of lead. The service from the start, on these engines, which by the way are the largest of the kind ever built, was satisfactory, they having developed a speed, fresh from the shop, of from 65 to 70 miles per hour, without the bearings even warming up.

If the readers of your paper should desire the name of this corporation, the writer will gladly furnish it. We understand that the parties furnishing this metal, will be glad to submit bearings made of the above composition to any railroad desiring to make a test. The payment of the metal will not be asked for until such time as the parties testing it are satisfied that the claims are correct.

Again I would suggest that the parties giving the formula in question take the trouble to look into this matter. G.

Palmer's Audible Signal.

BOSTON, May 29, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have often had occasion to feel gratified at the enterprise and candor shown by the *Railroad Gazette* in bringing into notice new inventions for railroad use. I have read with interest your description of Palmer's audible signal in the last issue. This device appears to me to have grave defects. The principle of its construction requires that the circuit through the relay *o* should be closed by the contact of the brushes *U* and *V* with the auxiliary rails before it is completed through *X Y* by the tilting of the post *U*, a length of time sufficient for this relay to attract its armature and open the circuit of the relay *p* at o^2, otherwise that relay may close the bell circuit by the movement of its armature, and give an alarm when there should be none. Then whenever an alarm is given, the current, during the time the brushes are on the contact rails, divides between two circuits, one of which is *o*, *V*, *a*, *k*, k^1, *U*, and the other is through the alarm bell. Should the relay *o* fail to operate, there might be *three* circuits closed at the same time. The battery must therefore be of sufficient size to operate them all at once, and the battery and relays must be carefully adjusted to each other, or the apparatus will fail. If there were sometimes one, sometimes two, and sometimes three circuits between which the current must divide, I fear a constant change of adjustment would be necessary. Also, a little snow or ice on the contact rails would render the system inoperative. These defects appear to me too grave to be overlooked; but there is, in my judgment, a yet more serious one in the *principle* of the apparatus. It works on an open circuit, with the normal position of the signal all-clear, and to produce a danger signal requires the action of a positive force, which *is not in existence* (at least in the apparatus itself) until the arrival of the train it is expected to protect. If there is one principle which more than another lies at the foundation of the future science of railroad signaling, it is that the normal position of an automatic signal should be at DANGER; that an all-clear signal should insure not only that the section to which it belongs is unoccupied and the switches all set for the main line, but that the apparatus is in normal condition *and actually at work;* that the force which produces the all-clear signal is being exerted every moment during the time that such signal appears. Its weakening or cessation should at once produce the danger signal, which should continue to be displayed until the controlling force is again applied. No signal which in its normal position (*i. e.*, in the absence of external force) shows all-clear can fulfill this requirement.

Moreover, this system would be exceedingly expensive at the outset. Before a single dangerous point can be protected or a single signal be made available, every locomotive on the division must be equipped with the apparatus. If a single one be omitted, or an engine from another road be run over the track, the whole system is, for that train, inoperative. A trifling derangement of the apparatus on an engine, which might occur at any moment of a journey, would disable the whole system until the trouble was remedied. Often this might necessitate the return of the train to the point of departure before repairs could be made, in which case a whole round trip would have to take place without the protection of a single signal. A stationary signal out of order usually has no effect on any other. At most one, or a very few others, are affected; the trouble is wholly local, and the other signals continue to perform their proper function.

These considerations, it seems to me, should proscribe any system of signals which requires some special equipment of the locomotive to make it operative. The claim of merit in this device that, being audible, "it commands attention even from careless and forgetful engineers," should not, I think, be allowed. No man should be permitted to run a locomotive whose record of service does not show beyond a doubt that he is neither "careless nor forgetful." The man who would forget to look at a stationary signal, the location of which he well knew, would, I fear, forget to shut off steam and apply the brakes at an alarm from an audible one, or to put water in the boiler. GEO. W. BLODGETT,

Electrical Engineer of the Boston & Albany Railroad.

Causes of Railroad Accidents.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Last February we had three wrecks on a part of our road that is comparatively free from serious accidents, as it is practically straight and has mostly level track or light grades. No one of these wrecks was over 20 miles from either of the others, and they all happened within a week. For months previous there had not been a wreck on this part of the road and none have followed. This was one of those queer combinations of circumstances that are sometimes repeated often enough to give a superstitious impression that they are governed by law. It is a fact that a large number of the trainmen that I am acquainted with believe that if one wreck occurs, two more will follow, on the same part of the road, and within a month; and those who do not care to confess a belief in it, still rather expect such a result to follow. Another portion of the division is almost a continuous curve, and the grades are heavy and so situated that trains have to run very fast down some portions to get over a heavy grade just ahead; and we have had the inevitable result—a large number of accidents; and I have noticed that it does happen in the way mentioned a great many times. A record of all serious accidents might not show a sufficient cause for such a belief; but I speak of it, as it illustrates how such superstitions become rooted in the minds of men.

These three accidents might be said to cover the whole field of railroad casualties, for each one was an illustration of one of three general divisions that accidents can be naturally divided into, viz: 1. Defective track or way; 2. Defective equipment; 3. Inefficient service.

1. One of the wrecks was caused by a broken rail in a straight track. The steel rail in that portion of the track had been in use for something less than 15 years. During the previous year, the bars that showed serious defects were removed, and the track was considered in safe condition. The track had been examined by section men between two trains that preceded the one that met with the accident; so no charge of neglect could be brought in this case. The rail, however, showed an old flaw extending from the first bolt hole up to the head of the rail—something over an inch long,—and the break was caused by a flat wheel striking this weak spot, or by some unusual strain or blow at this point.

It is a question how the rail in track on through lines can be kept safe. It certainly breaks faster after a certain amount of wear has been sustained. The danger can be overcome to a great extent on roads that have branch lines, by supplying the rail needed on the branch lines from rail in main line track that has had from four to six years' wear on curves, and from six to eight years' wear on straight track—that is, on a single track road that has about twelve trains daily each way. In this way the benefit is had of all the new rail for use on the main line. I have examined our record of broken rails and find that on 60 miles of comparatively straight track, with light grades, and subject to about the same wear, there were, in the first five years of its use, an average of 5 broken rails yearly on that portion of the division. During the next three years the average increased to 11, and in the ninth year there were 33, and in the tenth year there were 61 broken rails. Portions were then relaid and defective bars replaced, this reduced the number in the eleventh year to 31, but in the twelfth year it increased to 45, and last year, with mild winters, there were 64. There are innumerable elements of danger in all lines of railroad work, and if a change of rail could be made as suggested, instead of allowing it to remain where first laid until completely worn out, a very prominent and dangerous element in this line of work would be very greatly modified.

A very common source of danger to be met with in the maintenance of way, is that of fire. The Chatsworth disaster will be remembered in the West for years to come; and while that railroad company was most severely censured for having wooden trestles, and for not protecting them; still that particular structure was a trestle such as can be found probably on all railroads in the West, and which will have to be used on branch lines as long as timber can be had at any reasonable price. For there are a vast number of miles of branch or second class roads, that, to be operated at all, must be operated at the least possible expense; and the amount of traffic on many of these lines will probably never justify the substitution of stone, brick and iron for wood in all structures in embankments. While this particular trestle caught fire from grass or rubbish around and near it, and while fires are constantly occurring in dry seasons in the grass and weeds along railroads, still the number of structures of this kind that are destroyed by fire are comparatively few. I do not call to mind a single case of this kind that has come under my observation, although a possibility for it existed much of the time, for grass will often burn when green, and unless the ground is kept bare around timbers, or protected by a heavy coating of cinders, they cannot be said to be free at all times from danger by fire that may be started in grass, etc, near by.

On the other hand, I have known of three wooden trestles being on fire since the accident at Chatsworth, Illinois, all caused by fire dropping on stringers from engines passing over the track. The last instance occurred recently, midway on a trestle 114 ft. long. The trestle had double stringers, and all the ties had been renewed but a few weeks previously. Apparently the blaze was caused by fire dropped on the stringers by an engine which passed over it about an hour before the fire was discovered. It was a windy night, and before it could be extinguished, the caps of two bents and the accompanying stringers on one side, and ends of ties were burned nearly off. The stringers in the opposite side of the trestle also caught fire, and had it not been discovered until half an hour later, the structure could not have been saved, and unless discovered a wreck would have been inevitable.

A fire-proof paint or coating would not overcome this difficulty in all cases, as a timber is often decayed on top so that the coating would crumble off, and still the timber be sound and strong enough below to carry its load. A better precaution would be a strip of sheet iron placed on top of the stringers and above the caps under the stringers. There is very little danger from fire where ties rest on iron girders. Sheet iron used as suggested would produce practically the same conditions, besides being a protection to the timber from rains.

Washouts are a frequent cause of accidents, and are chargeable to defective way, as such trouble results from insufficient room for water way or from allowing water to be diverted from its natural channel. If culverts, trestles or bridges are known to be of insufficient capacity, or are defective in any way, there is a constant element of danger that no amount of watching or care can remove; and this applies to the largest bridges as well as the smaller culverts, etc. If defects cannot be remedied as soon as they become known, either by temporary or permanent repairs, they should be treated as dangerous, and fully watched, and used cautiously. It often happens when this course is taken, that is, after several months use, the defect does not cause trouble,

or does not get apparently worse, the danger is disregarded and thereby is really increased.

Short sags in track also increase the number of accidents. In reballasting, a few years ago, we took out a sag, caused by the settling of a short high embankment between two cuts, that had been the dread of freight train men, as their trains frequently broke in two at that point. The same trouble occurs where a heavy down grade changes abruptly to a steep upgrade; and cases of this kind are apt to occur where trains have to run fast to get up a steep grade ahead. Over 5 per cent. of the entire expense of wrecks for the past four years on our portion of road has been on account of trains breaking in two, and last year it was 15 per cent. of the whole.

2. One of the three accidents mentioned was caused by a defective wheel, which derailed one truck, and the wheels ran on the ties for a mile and then caught in a switch, causing the wreck. This class of wreck covers a larger number of accidents, and causes a larger expense, than the class just spoken of. Our expense in the last four years for wrecks caused by defective rolling stock or equipment has been three times that of defective track or way. "Foreign" cars are more apt to be in bad order than the regular cars of a road, as they are changing from one road to another, and employés are apt to let them run to save trouble and expense, when they would take more pains with cars on their own roads. Wheels with sharp flanges on the forward trucks of engines have caused several accidents that I know of, and by constantly crowding against the rail are very dangerous where the rail is worn, and there is a probable chance of a good many broken rails, for the flange grinding against the rail would catch where a rail is broken in straight track, when otherwise it would pass over a break without causing trouble. We had one of the wheels in an engine truck break a few months ago when out between stations. The track was straight and the truck ran or was shoved along on the ties for a quarter of a mile. They stopped the train in time to avoid a wreck, but although the "miss was as good as a mile," it was a narrow escape; for, in passing over a trestle, the derailed truck broke a cross-grained, sawed tie in the centre, broke the rail over one end of this tie and broke the joint fastenings of the opposite rail over the other end of this same tie, and still the whole train of freight cars went safely over it. Results are not always in keeping with the chances for trouble, or a bad wreck would have occurred at this trestle. The wheel went to pieces, piece by piece, and a circle of flaws seemed to extend clear around the wheel, in the centre of the tread.

Flat wheels are very dangerous, for blows given by them in cold weather are apt to break rails that are comparatively new and perfectly sound.

3. The last of the three typical wrecks was a butting collision caused by the engineer not noting a change in a new time-table. He was running extra and knew he had plenty of time to make a certain station for the express train, and knew that the express train previously had passed a regular freight at the same station. He went ahead, and although train men say they tried to stop the train, he met the regular freight train between stations. The trouble was, a change in time-table made the express pass the regular freight one station further ahead than formerly. Had the engineer of the extra consulted the new time-table, the accident would have been avoided.

This class includes the greater portion of accidents, and those that are the hardest to guard against, for those that are considered the best men sometimes make mistakes. While some instances seem to be due to combinations of circumstances, and would be hard to prevent, still it is hard to find a case that some one is not to blame for. Collisions, in almost every case, come under this head. Train dispatchers give lap orders. Operators fail to display signals, or will release a train that they had orders to hold. One train will follow another, hardly out of sight, when it has standing orders to run 10 minutes behind, and a sudden stop made by the head train makes a rear-end collision almost certain. Flagmen often fail to sufficiently protect their trains by not going a sufficient distance or by not getting to position soon enough.

Butting collisions have cost us only about one half what rear collisions have. The reason that head-end collisions are so much less in number is because they are the ones that are dreaded and constantly held in mind; and being guarded better, are of less frequent occurrence than those at the rear end. The latter occur in innumerable ways and in ways that are not expected, and while the responsibility for prevention of head-end collisions lies with a few men, say engineers and train dispatchers mainly, that of rear-end collisions is in the hands of train-men, switch-men, etc., and while precautions are taken in advance to prevent head-end collisions, those to prevent rear-end collisions must be taken on the spur of the moment, and often by new or inexperienced men, who do not realize the importance of the steps they are taking. Familiarity with dangerous work often divests it of its natural dread. I have noticed in quarry work that when the works are opened up that men will run a long distance to shelter when blasts are fired, but later on they can be found standing out in clear ground, preferring to dodge falling stones rather than take the trouble to reach a place of safety.

On crooked track the men cannot change a rail, or distribute a truck load of ties without protecting such work with danger signals, and quite often an extra train will be flagged. The flagman will be out perhaps a mile, or even more on a steep down grade, and he signals a train to stop; the call for brakes is heard by the track men, and by the time the train has stopped, the track is clear and the train is signalled to go ahead. Such delays are very apt to provoke trainmen, and they probably will not try as hard to stop the next time. We recently had an engine and cars go down a high embankment where the men were replacing a broken rail. The flagman was out one and a half miles, and the engineer called for brakes, but failed to get the train to a stop. Men are not apt to take vigorous measures for safety unless they know that danger actually exists. And when they have neglected some precaution a few times and no bad results follow, it is very apt to be neglected, except when there is known to be actual danger near. Train men have standing orders to approach stations with the train under control. Some trains have limited and specified time in which to make a run. Trainmen claim in such and in nearly all cases, that they could not carry out this standing regulation and similar orders, and get over the road as they are expected to do. In short, they consider such orders impracticable, and look at it as a matter of luck as to how long it will be before they get caught by circumstances. When working under such impressions the sense of danger becomes blunted, and instead of experience acting as a teacher to make men more alert to danger, it produces the opposite effect of leading men to take chances that absolute safety does not allow. Trainmen are not the only employés that are liable to become careless. There is hardly an employé connected with the active work of maintenance or operation that does not have some responsibility resting on him, but in track work, bridge work and, most of all, in the running of trains, the necessity is great for constant care and watchfulness on the part of almost every man in order that accidents may be avoided.

The whole field of railroading is beset with dangers, and few realize how hard a matter it is to operate it without injury to the traveling public and employés. On those railroads that show the best record in this respect will be found the most thorough methods of maintenance of way and equipment, and the most consistent system of operation. It is very evident that railroads in the future will have to be handled with the greatest economy, as the competition is so great that rates must necessarily be low. How to maintain and operate cheaply, and at the same time preserve standards of safety, will be the problem. It cannot be accomplished by state or national laws, for circumstances and conditions vary everywhere. Almost every railroad accident is the result of the violation of some regulation of the road, and the accidents would happen just the same if these regulations, made by the railroad company, were laws made by the state.

It is only by a thorough and consistent system that applies to all departments, and is as complete in minor details as in the most important ones, that the art of railroading can be brought to anything like perfection. It cannot be done when the payment of a certain dividend, regularly at stated intervals, is the first thing considered. Work to be done economically and permanently must be done at the right time and with proper material. It will often happen that the heaviest expense for maintenance will come at seasons when the net returns are light. This provision for a dividend which restricts and postpones work is a common evil; and, until it is changed and the provision made first for necessary expenses of the ensuing year, work will have to be neglected. The danger in such cases is increased, and the work in a great many cases is made very much more expensive, and often by being done at wrong seasons is not as permanent or safe.

No element of danger is as great as inefficient service, and the best service can only be obtained by employing men who take personal interest and pride in the work; this can be encouraged by making promotions carefully and with a view to filling the places with those men that are the best fitted to do the work required. They should not be discouraged by being asked to work under impracticable rules or punished for other men's mistakes.

Summing up the causes of accidents, we find them all pointing to one of the greatest, if not the greatest, problem of the day—safe and economic railroading. The public is interested as a matter of safety, and the railroads are as a matter of expense. The American public is quick to appreciate efforts to improve, and railroads have shown by their introduction of improved methods and appliances, as fast as perfected, that they are trying to do their part.

ROADMASTER.

Recent Railroad Construction in Kansas.

Kansas was a battle field in the years 1886 and 1887. The railroad powers of the West had declared for war. Conquest of territory by one side, and its defense by the other were the measures involved.

The territory of the Santa Fé and the Union Pacific was invaded by the Rock Island and the Missouri Pacific systems. The Union Pacific was helpless for defense on account of the restrictive enactments of the United States Government, so that the Santa Fé was almost alone in the fight against the invaders. The struggle went on till all the powers were exhausted, with the enormous addition of 3,500 miles of new extensions in two years. This was an increase of 75 per cent. in mileage in that time, over a length of line already ample to meet the demands of the business available.

The boom in railroad construction induced a corresponding business boom for the state. Real estate appreciated rapidly in value, hundreds of new towns were started and additions to the old towns platted. Business blocks, waterworks, street car lines, gas and electric light plants were promoted and constructed. West bound freight, consisting of construction material of all kinds was therefore enormous. Urban and railroad business flourished exceedingly, but the farming interest languished. Crops were poor on account of droughts, hot winds and insects injurious to vegetation. These conditions, however, passed unnoticed or unheeded by the boomers, buoyed up by the fever of speculation.

In the census year of 1880, 3384.71 miles of railroad were reported in operation in Kansas, 4992.64 miles in Iowa and 7562.39 miles in Illinois. The table below shows that at that time the traffic conditions of Kansas railroads were considerably below those of Iowa or Illinois, so far as probable tonnage was concerned.

AVERAGE AMOUNT OF AREA, POPULATION, IMPROVED LAND, AND PRODUCTS BY VALUE TO THE MILE OF COMPLETED ROAD.

State.	Area. Sq. miles.	Population.	Improved land. Acres.	Products by Value.				
				Farm.	Manufactures.	Mines.	Quarries.	Total.
Illinois.	7.5	407	3,543	$26,973	$54,859	$1,178	$177	$83,187
Iowa.	11.2	325	3,979	27,261	14,230	499	134	42,124
Kansas.	24.2	294	3,173	15,434	9,113	720	42	25,309

In 1885 the relative traffic conditions per mile of railroad in Kansas had not changed very much, so far as population, improved land and value of products was concerned, but the rate per ton mile had been largely reduced. In 1886 some change occurs, as shown by the table below, occasioned by the construction of 607 miles of new road. But in 1887 a great falling off in population and acres of improved land per mile of road is noticeable. The value of products I have not been able to obtain for those years, but there must have been a large decrease in the value of farm products per mile of road, on account of crop failures of those years, as well as the increased mileage.

KANSAS RAILROADS.

Year.	Miles railroad July 1	Square miles, population and improved land per mile of railroad.		
		Square Miles.	Population.	Improved land, acres.
1885.	4,750	17.2	267	3,000
1886.	5,357	15.3	263	2,886
1887.	7,356	11.1	206	1,964
1888.	*8,418	9.7	180	1,782

* Estimated from mileage at beginning and end of year.

Not only were railroads built largely in the Eastern section of the state, which already had sufficient mileage for the business in sight, but long lines were extended into the semi-humid and arid regions of the western half of the state; lines of opposing companies paralleling each other closely, and all striving for business. Crops in this region are very uncertain and liable to prove a failure every two years in three. In this western country the hot south winds during June, July and August are as potent a factor in the destruction of crops as drought. The precipitation may be ample, but should these siroccos develop, the finest crop prospects may be destroyed in a few hours.

To this region, and to the towns, the large increase in population during the years 1886-7 should be assigned. Most of the agricultural townships in the eastern half showed no increase in population, while many townships suffered an actual loss because of the emigration to the Western free lands.

At the present time more than 8,000 miles of railroad are in operation in Kansas, with about 45 workers per mile of railroad to provide and carry on the traffic.

Of these 45 workers about 30 are farmers or farm laborers, cultivating only 60 acres of land each; while of the remaining workers, 5 are engaged in professional and personal service, 5 in trade and transportation and 5 in manufactures and mines. This statement shows that the great percentage of normal business must come from the agricultural class, with only 60 acres of land in cultivation for each farmer, and that farming done in poor fashion by wasteful methods and under the adverse conditions governing a comparatively new country with unreliable crop climate.

A comparison of statistics of gross revenue per capita in years of normal business in Kansas, Iowa, Wisconsin and Missouri would indicate a value of about $15 as the ordinary maximum, while for years of business stringency and poor crops $10 per head would be a probable minimum. During the years 1886 and 1887, with unprecedented activity throughout all the country, this per capita revenue was much larger, amounting to as much as $27.25 in Kansas in 1886, and $18.25 in Iowa in 1887. But such years are exceptional and should always be considered as abnormal when estimating on future business. At $15 this would amount to a gross revenue of $2,700 per mile, and with operating expenses of 66⅔ per cent. of the gross earnings, would leave net earnings of $900 per mile, or enough to pay interest charges at 6 per cent. on a bonded debt of $15,000 per mile. Were the gross revenue per capita reduced to $12 on account of hard times and adverse legislation, there would not be sufficient revenue to pay the fixed charges even.

Where there is a great surplus above the needs of the people, whether it be of wheat, calico or transportation, low prices must obtain for these products. Kansas has such a surplus of what might be termed potential transportation, stored up at great first cost and requiring continued annual expense for maintenance. The purchasers are limited in number and buying ability. The result must be diminished earnings, with no corresponding lessening of expenses for the railroads. This will continue till the normal relations of population and values to mileage return. Taking even the past rapid growth of Kansas as a basis for estimation, a period of at least four or five years will elapse before divi-

dends can again be earned. The result may lead to bankruptcy and liquidation in some quarters.

From the foregoing it would appear that so far as immediate benefits to the powers involved are concerned this war was a failure. HUBAL.

Proposed Rail Sections.

BY ROBERT W. HUNT.*

When I had the honor of presenting to the Institute my paper on "Steel Rails and Specifications for their Manufacture," I expressed my hesitancy in submitting my ideal rail sections. Since then, continued residence in Chicago perhaps, or greater intercourse with railroad officials, has either given me more courage or taught me that so little is really known on the subject, that one is safe in expressing his views let them be ever so erroneous. As a further personal excuse, you may remember that "fools may venture," etc. At all events, I would now call attention to certain rail sections which I believe to be good ones. I do not say they are the best, but I am positive that they have more merit than the majority of the adopted heavier sectioned rails.

In determining the proper form for a rail the subject should be considered from two points. First, and most important, the duty required. Second, and of almost equal importance, the influence of existing manufacturing details upon the character of the finished product.

It is perfectly proper that all the strains to which the proposed rail will be subjected should be considered and calculated. But the ability to resist them will depend quite as much upon the character of the metal as the form of its section. That which would be the realization of the ideal with *good* steel would be disappointment with poorer metal. Therefore, the railroad engineer should always have in mind and pay due respect to what the metal worker *may* give him —the *may* being his factor of safety, and of greater importance than any formula laid down by never so eminent authorities. It is well known how positive I am that high heat during manufacture and good rails cannot go together; hence, if we insist upon rail makers avoiding it, we must give them sections which can be commercially successful made at low temperatures.

The market price for rails controls. Of course, railroad managers want the best possible, but also must have it, or its resemblance at least, as cheap as obtained by their neighbors. Great reforms are generally inaugurated by bold spirits who disregard the then controlling influences. In this case I do not think any fanaticism or martyrdom is required, but believe all necessary or practical perfection can be obtained without seriously antagonizing or disturbing existing commercial conditions.

In my Buffalo paper I quoted from O. Chanute to demonstrate how great had been the increase of wheel pressures. Since then D. J. Whittemore, Chief Engineer of the Chicago, Milwaukee & St. Paul, has presented an able paper to the American Society of Civil Engineers, in which he further elaborates that point. I presume that all authorities agree that the necessity exists for stiffer sectioned or heavier rails. In other words, the demand for heavier rails is because the weight of wheel pressures requires a stronger beam to support it. The railroad engineer naturally desires to secure this with the smallest outlay, and hence with the lightest practical section. This can be designed, assuming as before intimated that the metal in it shall possess certain physical properties. But for the calculation to be of value, the assumed properties must always be present.

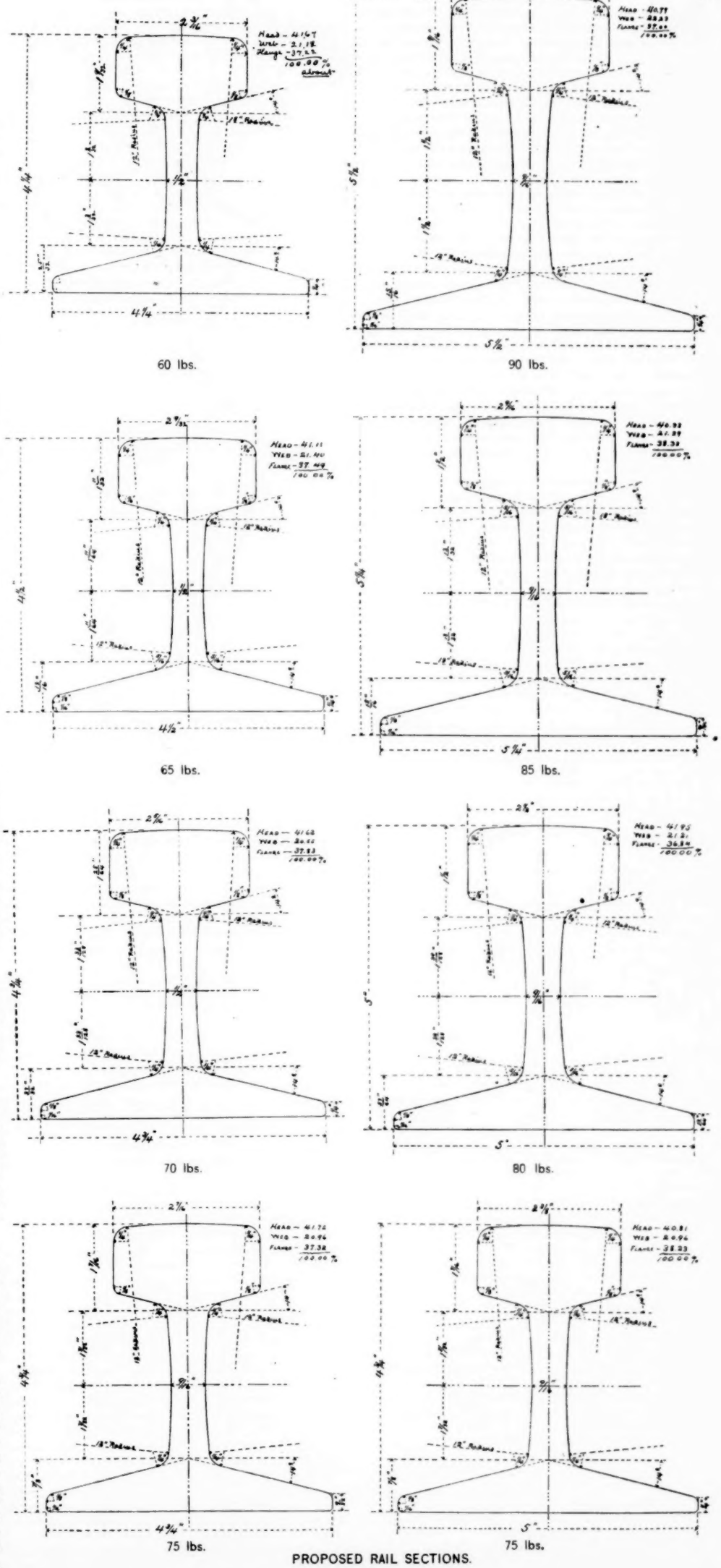
The metal commonly known as steel is almost as sensitive to treatment as woman. It will stand any amount of punishment if administered by judicious hands, and unexpectedly rebel if a less amount is given with indifference. Now we cannot always control the judgments, or rather the actions of the irresponsible steel operatives: therefore sound policy dictates that we give them a section to which they can do the least injury.

The earlier rails which gave such satisfactory results, and which have been so constantly presented to rail makers as representing that which *they* ought to do, were all of light sections. They were made from steel which had never been heated to the utmost limit of its endurance, and were made on mills whose roll pressures penetrated well through the rail heads. In rolling later rails the steel has been almost always worked at a higher temperature, and as the sections have been increased the penetration of the roll pressures has decreased.

It was supposed that the chemical character of the steel in the earlier rails accounted for their superior wear. Among the makers of these rails, Sir John Brown & Co., of Sheffield, England, sent to this country those which, from their most excellent service, were considered by railroad engineers as the type of what rails should be. Accepting the chemical theory, rail makers expected the analyses of these celebrated rails would present steel of exceptional uniformity and purity. The opposite has proven to be true.

I have examined the analyses of numbers of these rails which had been removed from the track after many years of good wear, and had been selected as representing ideal rails. When we consider that the carbon varied from 0.24 to 0.70 per cent., the silicon from 0.031 to 0.306 per cent., the phosphorus from 0.077 to 0.156 per cent., the sulphur from 0.050 to 0.181 per cent., and the manganese from 0.312 to 1.046 per cent., we are forced to the conclusion that their chemical composition was not the controlling influence in their good character. I am therefore strengthened in my belief that the sections and physical treatment of the steel during manufacture must account for the results obtained. As I have stated

*This paper was read at the last New York meeting of the Institute of Mining Engineers.



PROPOSED RAIL SECTIONS.

BY MR. ROBERT W. HUNT.

on previous occasions, the early steel makers did not know so much more than the later ones. They had much less knowledge, and in consequence were afraid to radically depart from the then existing traditions of steel making.

I do not claim originality in advocating broader headed rail sections. The present well-known standard 80-lb. rail of the New York Central & Hudson River was designed by P. H. Dudley, C. E., in April, 1883. I filled an order at the Troy Works for 1,000 tons of this section in 1884. The rails were laid through the Fourth avenue tunnel of the Hudson River road, extending to the junction with the Harlem road. Rails of other and lighter sections had given unsatisfactory results at this point. After one year's experience the New York Central & Hudson River adopted the Dudley section as their standard 80-lb. rail, and have since then put down several thousand tons each year. In fact they are relaying the whole Hudson River division with it.

As you know, our fellow-member, P. H. Dudley, was the first to use the dynagraph car in determining the condition of roadbeds, and has for a number of years devoted himself to that branch of his profession. His observations convinced him that to successfully meet the tremendously increased wheel pressures rails must present a broader head surface. As a result we have his 80-lb. rail. As you will see upon examining my 80-lb. section, I have not adhered to the Dudley rail, but closer to the one adopted for the Michigan Central by Chief Engineer J. D. Hawks. In designing all my sections, I have kept in view the controlling circumstances of their manufacture, adopting wide and comparatively shallow heads, strong webs and flanges, with thick edges. I have tried to distribute the metal so as to avoid cooling strains and give rails which will require the minimum of cold straightening.

As at present conducted (and mechanical talent has as yet failed to find a better way), cold straightening is the enemy of a perfect rail. It is generally accepted that the hardness of the steel must be increased, and as we do so we augment the danger of broken rails at the "gag marks." And if in seeking to avoid this the straightening is performed while the steel is too hot, "lumpy" or "wavey" rails will be the re sult.

I present 60, 65, 70, 75, 80, 85 and 90-lb. sections. There are two 75-lb. rails; the first with a 4¾-in. and the other with a 5-in. base. The latter to meet the views of those engineers wanting that width of base, owing to their compelled use of soft wood ties or from other reasons.

These sections are all designed for the use of fish-plates. When the time comes, and I believe it will and should, that joints affording a base support are used, we will then discuss a very different rail. Until then I respectfully submit these.

The Great Pennsylvania Flood.

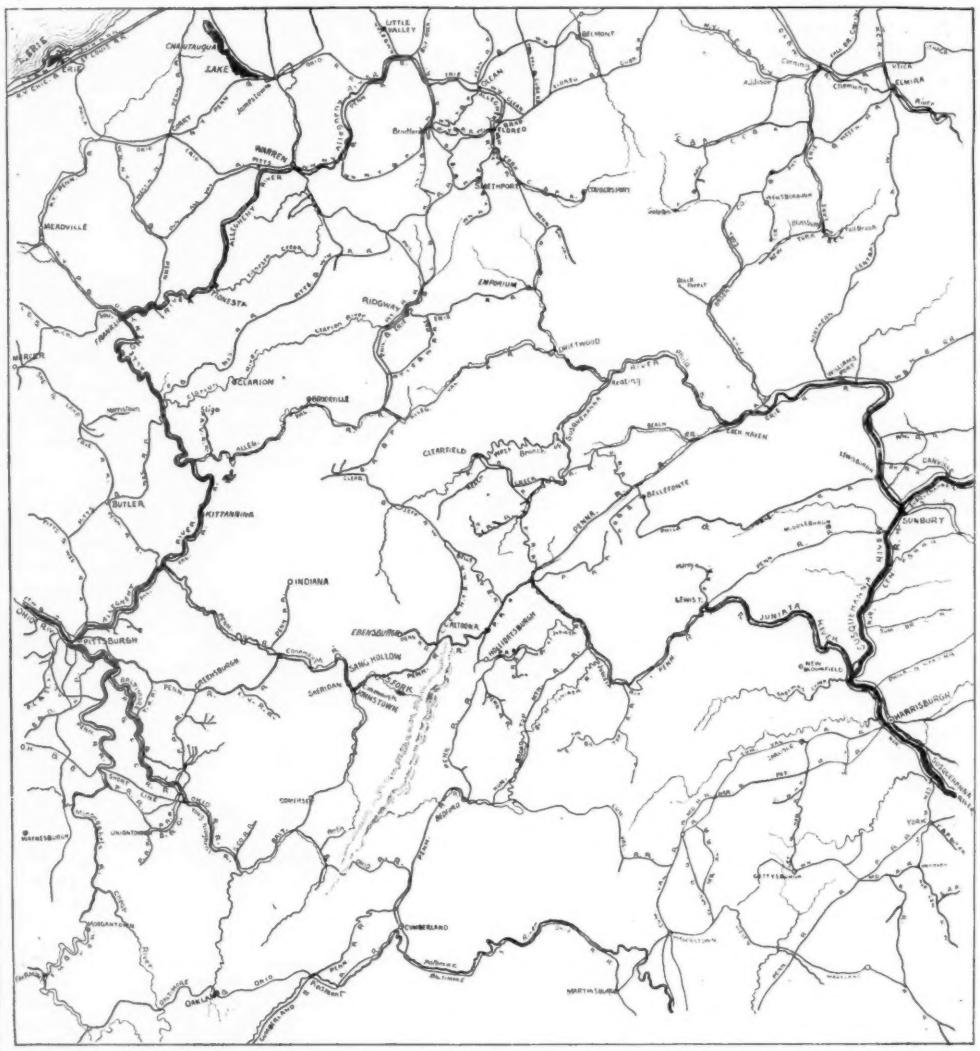
The great flood which on Friday and Saturday last devastated large portions of the valleys of the Susquehanna and Potomac rivers, and, by the breaking of a dam on the Conemaugh River, swept away Johnstown and its neighboring villages, causing the death of thousands of people, is already known to all our readers. As in nearly all catastrophes in this country of this nature the railroads are among the worst sufferers, and in the present instance the greatest railroad system of the country suffers a loss which only a very strong corporation could withstand. While the reports thus far obtainable are fragmentary and incomplete we present below such information concerning the damage to roadway as we have been able to gather. The accompanying hastily prepared map will serve to give a general idea of the localities. It embraces all the territory most seriously affected except the lower Potomac River. Washouts innumerable occurred in the whole region shown, and the details will be gathered only after several days.

The reservoir (which is shown in the map under the word "Fork" just east of Johnstown) broke on Friday afternoon, and the body of water that went out and down the narrow valley, in which is the main line of the Pennsylvania Railroad, presented a front which was a solid wall 50 ft. or more in height. There had been washouts earlier in the day, so that all passenger trains in the region appear to have been side-tracked. Two of these were at Conemaugh. Most of the passengers escaped to the hills only a few seconds before the flood struck the trains. One car was floated off, all were submerged and several passengers—5 to 10—were drowned. The reports are still indefinite, and the number of deaths cannot be accurately stated.

The tracks at Sang Hollow, west of Johnstown, whence the first reports of the flood were telegraphed, were torn out and washed away for a distance of three-quarters of a mile. One track was swept into the river, the rails and ties of the east track were thrown on top of the west-bound track, and in one place they were twisted into a plait. This statement with variations applies at many other places. Thirty or more locomotives belonging to the Pennsylvania were washed away with the round-house in which they were standing and are lying in the river bed under the debris at Johnstown. One tender is said to have been carried a mile down stream.

The newspapers publish a thrilling tale of the escape of a freight crew and another of a passenger train that was stopped, backed down, and got into a safe place just in the nick of time; but the details bear some signs of an extravagant hand, and they need some explanation.

But the widespread flood east of the Alleghenies was second only to that in the Conemaugh. The Susquehanna, Juniata and other rivers rose many feet higher than ever before, and the damage at Lockhaven, Williamsport and all that region will count into the millions. At the latter place probably 50 persons were drowned, and the total death record in Pennsylvania and Maryland will approach 100 aside from the victims in the Conemaugh Valley.



Scale: About 32 miles = 1 inch.

Sketch Map of the District Principally Affected by the Recent Flood.

The Pennsylvania railroad purposes to patch up a route from Harrisbug to Altoona by way of Sunbury, Williamsport, Lockhaven and the Bald Eagle Valley road southwest from the latter place; but this depends upon the bridging of the Susquehanna at Montgomery, ten miles south of Williamsport, where a long bridge is gone, as well as upon filling numerous other gaps whose magnitude is yet to be measured, so that it is doubtful whether this or the route over the middle division of the main line will be first made passable. At best the through traffic of the road must suffer an interruption of more than a week. The company has bought 4,000,000 ft. of lumber, and has massed its carpenters and other workmen from the whole road.

The plant of the Cambria Iron Co., whose rail mill and other works were the principal industry of Johnstown, employing many hundred men, was almost completely wrecked the company's loss being probably $5,000,000. The officer say that the works will be rebuilt at once.

The principal bridges reported destroyed or damaged are shown in the list below:

Pennsylvania Railroad.—West from Harrisburg: Granville bridge, Juniata River, about three miles west of Lewistown Junction, four spans completely washed away. Bridge 640 ft. long; built in 1887. Mayes bridge, Juniata River, about 2 miles west of Granville bridge, whole bridge completely wrecked. Five spans, 640 ft. long; built in 1860. Manayunk bridge, Juniata River, 2 miles west of McVeytown, whole bridge completely wrecked. Five spans, 640 ft. long. Built in 1871. Petersburg bridge, Shafers Creek, about one mile west of Petersburg. Whole bridge reported wrecked, but two spans are known to be down; 156 ft. long. Built in 1877. Viaduct bridge, Conemaugh River, about eight miles east of Johnstown. Single span of stone arch reported washed away; 80 ft. long; built in 1832 by the State. South Fork bridge, Conemaugh River, near South Fork. Two spans, iron girders; washed away; built 1886. Little Conemaugh bridge, No. 6, Conemaugh River, just east of Johnstown. Two spans of iron girders; entirely destroyed; built in 1869.

The Montgomery bridge on the Philadelphia & Erie, crossing the Susquehanna, twenty-two miles from Sunbury, a long bridge, is entirely washed away. Leechburg bridge, and the Hyndman bridge, on the Bedford branch, were washed away.

Mount Dallas bridge, about five miles east of Bedford, was undermined and impassable. Bolivar bridge, Conemaugh River, a steel truss was swept away. Linden bridge across the Suequehanna was washed away, and of the Williamsport bridge, across the same, three spans are gone.

Of the twenty bridges south of Ralston on the Northern Central five are washed away and all the rest are badly damaged with one exception. North of Williamsport four or five small bridges across Lycoming Creek have been swept away. All the railroad bridges above Blairsville were carried away.

The Rockville, Sherman's Creek, Tuscoura, Mt. Union, Danwander and Little Conemaugh bridges are understood to be uninjured, and the seven arch bridge over the Conemaugh at Johnstown, where the immense gorge, occasioning the fire and the terrible loss of life occurred, is still standing as firm as ever, but the approach thereto for a distance of 300 or 400 ft. between the station and the bridge has been washed out. This bridge cost $60,000 and was built in 1887 and 1888.

Cumberland Valley.—Martinsburg high bridge over Potomac River is partly gone, and the remainder is insecure. At Williamsport (Md.) a new iron bridge over the Potomac River was destroyed. Sinnemahoning bridge and Keating bridge, both crossing Sinnemahoning Creek, are gone. Several others have been lost, but their names are not given.

Philadelphia & Reading.—Sunbury bridge, Susquehanna, on the Williamsport branch, fourteen spans, 2,600 ft. long. Three spans carried away; built in 1883; cost from $8,000 to $10,000 a span; a single-track bridge.

Milton bridge, Susquehanna, wooden bridge, Howe Truss, built in two portions, eight spans, about 1,250 ft. long. Completely destroyed; built in 1876. Muncy bridge, Susquehanna, Williamsport branch, six spans, 1,003 ft. long, wooden. Washed away; built in 1876.

New York, Lake Erie & Western.—Several bridges are reported lost near Hornellsville, and also at Andover, N. Y. A large bridge is lost at Elmira, N. Y.

Delaware, Lackawanna & Western.—A large bridge at Waverly, N. Y., was swept away.

Fall Brook Coal Co.—Two bridges are lost and the track is badly washed out between Knoxville and Westfield, Pa.

Baltimore & Ohio.—At Laurel, Md., a bridge on this road was reported carried away, and four small bridges between Glen Cove and Hyndman were undermined, but in general this company seems to have been one of the smallest sufferers, and trains were running through on Tuesday.

The long bridge across the Potomac, at Washington, D. C., was overflowed, and the draw span with one fixed span adjoining it floated down stream. It is thought that they were fractured by the heavy boats which drifted against them. The clearing away of the water shows that the whol

trestle work south of the Long bridge has been carried away, as well as much of the embankment. On the Richmond & Danville, near Washington, many culverts were washed out, and the roadbed in many places damaged. Goose Creek bridge was weakened. Washouts were reported at Edsall's, Burke's and other places. On the Alexandria, & Fredericksburg the track near the bridge over Cameron River was badly washed, and the bridge weakened. Near Cherry Hill there was a big washout, and others are reported. On the Gettysburg & Harrisburg a half mile of embankment was swept away. On the West Virginia Central & Pittsburgh two bridges were swept away, and the total loss of that road is estimated at $250,000. The Cumberland & Pennsylvania had two big trestles carried off. The Chesapeake & Ohio canal, which has suffered great damage, is referred to elsewhere.

The American Society on the South Fork Dam.

At the regular meeting of the American Society of Civil Engineers, June 5, there was a discussion of the cause of the failure of the dam on the South Fork of the Conemaugh, which has caused such death and destruction at and about Johnstown.

Mr. Wm. P. Shinn, Vice-President of the New York & New England Railroad, moved that a committee of four members of the society be appointed to investigate the cause of the failure of the dam. The committee appointed is Mr. Max J. Becker, President of the Society, Chief Engineer Pennsylvania lines west of Pittsburgh; Mr. J. B. Francis, of Lowell; Mr. Wm. E. Worthen, of New York, and Mr. Alphonse Fteley, Chief Engineer Croton Aqueduct.

Mr. Shinn described the dam and its surroundings, which description was supplemented by others present, from which it was gathered that the dam was built in 1840 to feed the Western Division of the Pennsylvania Canal, which commenced at Johnstown. It was probably an earth and stone dam, 60 or more feet high. When the canal was abandoned the dam was broken down, and it was stated that this was done designedly; and it was also said that it was done by a flood.

Some ten years ago the South Fork Company bought the land about the dam and rebuilt it. Mr. Brendlinger, who was there while the breach was being repaired, said that shale and rocks from the side of the gorge, at one end of the dam, was dumped into the breach. The dam as it stood before the accident was some 50 ft. wide on top with a waste about 75 ft. long and 4 ft. deep, cut in the shale rock.

Mr. John G. Parke, an engineer from Philadelphia, who was on the ground superintending some drainage work, found on the morning of Friday that the heavy rain of the preceding night was raising the water, and getting some workmen together commenced cutting an additional waterway through the shale, but in spite of his efforts the water continued rising at the rate of about 10 in. per hour, and about noon he went down to the South Fork station on the Pennsylvania Railroad, and sent a telegram down the valley warning the inhabitants to leave their houses. It has not yet been satisfactory explained why so few heeded the warning. Those at South Fork saved their lives and a great deal of the furniture.

The water at length ran over the top of the dam and between 2:45 and 3 o'clock the dam burst, making a gap from 300 to 400 ft. wide. For about 100 ft. this breach goes down to the original surface, and the rest of it is about two-thirds the depth of the dam.

Trials of the Quick-acting Westinghouse Brake in Germany.

A recent issue of *Glaser's Annalen* contains an account contributed to the German Railroad Union of trials made on the Baden State Railroad of the Westinghouse quick-acting brake. The trials were made with a train of 50 two-axle cars on a straight and practically level track near Philippsheim. We need not go into the details of the brake, as given by Mr. Emmerich, as the greater number of our readers are undoubtedly familiar with its construction. The modifications made in the apparatus after the last Burlington trials were introduced.

All the cars were fitted with brakes, and the trains were made up as follows: 1. Train of 18 cars; *a*, with the old form of Westinghouse brake and 1-in. pipes; *b*, with the quick-acting Westinghouse brake and 1-in. pipes; *c*, with the quick-acting brake and 1¼-in. pipes. 2. Train of 30 cars with quick-acting brake and 1¼-in. pipes. 3. Train of 50 cars with quick-acting brake and 1¼-in. pipes. The 18-car trains were about 538 ft. long, the 30-car trains 869 ft. long, and the 50-car trains 1,548 ft. The point at which the brakes were to be applied was marked by a signal flag; the starting point for the trials, as well as two other points, 656 and 1,312 ft. in advance of this, were fitted with track torpedoes. While running over the distance between the second and third torpedoes the speeds were taken, two speed indicators in the last car of each train being, moreover, used for this purpose. In fact, the time, distance covered, air pressure and speed were all measured and recorded in this last car by special apparatus, the car, further, being in telegraphic communication with the engine.

The trials showed, among other things, that while with the 18-car trains the quick-acting brake appeared to offer no appreciable advantage over the old form of Westinghouse in point of rapidity of stopping, its action was much smoother and even in emergency stops there were no shocks. With a speed of 42 miles an hour and an air pressure of 3½ atmospheres in the brake cylinders of the last car, after applying the brakes the distance covered before coming to a stop were as follows with the 18-car trains: *a*, with the ordinary Westinghouse brake, 659 ft.; *b*, with the quick-acting Westinghouse and 1-in. air pipes, 594 ft.; *c*, with the quick-acting Westinghouse and 1¼-in. pipes, 640 ft. In the three instances the brakes were applied in the last car after ⅞, ¾ and ⅝ second. The lengths of time during which the brakes were in operation were 17.4, 17 and 18.5 seconds, and they were all in full action after the lapse of 3¼, 1¼ and 1⅛ seconds.

A 30-car train equipped with the quick-acting brake and 1¼-in. pipe, running at 40.8 miles per hour, and with 3.7 atmospheres in the brake cylinder of the last car, after applying brakes, was brought to a stop in 17.5 seconds in a distance of 600 ft.; a 50-car train, running at a speed of 27.6 miles, and with 3.4 atmospheres pressure, was stopped in a distance of 302 ft. in 12½ seconds. Running at a speed of 35 miles, and with an air pressure of 3.5 atmospheres, the corresponding figures were 462.5 ft. and 15½ seconds. Reducing the distances covered before coming to a stop to a common basis of 3.5 atmospheres pressure and a train speed of 42 miles per hour, they were found to be 672.4, 678.9 and 665.7 ft. respectively, as against 640 ft. in the case of the 18-car train. Taking into consideration the slight differences between these figures for the 50 and the 18-car trains, it is fair to say that the length of train bears little relation to them when using the quick-acting brake for emergency stops.

In the emergency stops with the 30-car train there were no noticeable shocks, but with the 50-car train there were shocks sufficient to twice break the couplings. While Mr. Emmerich does not consider this a very serious matter under the conditions, he holds that it emphasizes the necessity of braking every car, and that equally. The one objection which he brings forward to the quick-acting brake is, that when using it for an ordinary stopping, it requires very careful handling, so as not to bring about an emergency stop. This brings with it slower action of the brakes and longer distances covered before stopping. This objection, however, has also been overcome by the adoption of an intermediate valve. The quick-acting brake with 1-in. pipe was tested with eminently satisfactory results on an 18-car train on a 7-mile stretch. In view of the unavoidable complication incident to the use of electrically controlled brake valves, Mr. Emmerich considers the improved and comparatively simple brake a noteworty and highly valuable achievement.

Pursuing the subject further, he comments briefly on the Schleifer and the Carpenter air brakes, which are now also in use on some German railroads. In the Schleifer brake he notes the improvement in the escape valves, which has had the effect of enabling the brakes to be applied on the last car of a 15-car train after not more than 1 second and to be in full action after from 2½ to 3 seconds. This is a decided gain over the time of 2 and 6 seconds respectively occupied in the older form. The simplicity of the brake and its ready control make it, he thinks, in its new form, a somewhat formidable competitor of the Westinghouse.

The Carpenter brake has not been improved if we ignore its electric modification. In fact, Mr. Emmerich regards it as wholly unfit to meet, successfully, the requirement of modern railroad service, and criticises its extensive use on German lines. In concluding his paper he warmly advocates the introduction of the quick-acting Westinghouse brake for freight as well as passenger train service and briefly reviews the question of cost and equipment in Germany.

The Frost Dry Carburetter System of Car Lighting.

The careful illustrations of the Frost dry carburetter system of car lighting, which we give here, are engraved from the working drawings made at the Altoona shops of the Pennsylvania Railroad. The system has been adopted as the standard of that road.

This system of lighting has been designed with a view of fulfilling the following demands: 1st. Safety beyond the suspicion of danger. The system has been approved by the New York Board of Underwriters. 2d. Economy of first cost and operation. 3d. Ventilation under all conditions of railroad service, with a minimum of heat radiation. 4th. Even distribution of light to a degree that will enable passengers in any part of the car to read easily without straining their eyes. 5th. Simplicity of operation.

Air and the volatile oils obtained from petroleum combined in proper proportions, produce the cheapest illuminating gas known outside of natural gas. The greatest obstacle to the use of this class of light has been the danger attending the storage of these volatile oils. This difficulty has been overcome by the removal of a necessity for bulk storage by the use of the property of capillary attraction of the wicking. The wicking is made to gradually yield its hydrocarbon to a current of air forced through it, and conveyed thence to the burner, in such proportions as to give a satisfactory, economical and brilliant light. The carburetter is completely filled with wicking, thus avoiding the presence of the volatile fluid in fluid form.

In designs of this sort it has been difficult to overcome the effects of variation in the temperature; because while in the heat of summer air-gas gives a rich and brilliant light, yet it becomes poor and feeble in winter. This difficulty has been overcome by placing a small generator or carburetter above each light, in the roof of the car, in such a manner that a portion of the heat generated by the burner is transmitted to the carburetter, thus insuring a uniform temperature at all seasons, and supplying the necessary heat for vaporization.

In the design herewith illustrated the air is obtained from the air-brake service; if the car be detached from the train sufficient compressed air is stored in the air-tank to maintain the lights about six hours. The compressed air is conducted by means of pipes into the saloon, where the pressure is regulated, thence to the roof of the car, supplying the carburetters successively, therefore, no gas is carried through the pipes connected with the system of piping in the car, as the gas is conveyed directly from the carburetter to the burner beneath. For greater safety, the carburetter is inclosed in a heavy, seamless, copper casing, which in turn is surrounded by a double kalamein iron mantle, as shown. In charging, a small can, shown in the illustration, containing 2 gallons of oil, is attached to the carburetter, making a gas-tight joint and a train-hand can charge the entire car in about five minutes. This, in ordinary service, will last about two weeks, and as no machinery is employed to accomplish this, the cars can be charged at any desired point. The system carries about 2 cu. ft. of gas to each carburetter, or a total of 12 cu. ft. per car, under 3 lbs. pressure per sq. in. in the carburetters, and gives 125 hours light between chargings. No part of the system is under high pressure at any time. Should a wreck occur and the carburetters be displaced, they are made of such flexible material (copper) that they will stand much distortion without rupture, and the gasoline is absorbed in the wicking, so that, although every cock on the carburetter be opened, no liquid can run out. Each carburetter has a burning capacity of 125 hours, but the indicator is set for 120 hours. Each burner gives 40 candle-power light. After two years of actual service, it has been found that a car equipped with six lights is maintained at a cost of three cents per hour; this includes all expense and maintenance.

The following is a short description of the parts: Underneath the car (fig. 1) air is taken from the train pipe into a cylinder, which serves as an air-storage reservoir. Between the train pipe and the storage reservoir are the check valve and dust screen. This is shown in section, fig. 9. The dust screen prevents anything in the air from getting into the check valve and beyond it. The check valve opens toward the storage reservoir, so that when the pressure in the train pipe is greater than the pressure in the storage reservoir, the air passes from the train pipe into the storage reservoir. When from any cause, as when the air brakes are being applied, the pressure in the train pipe is less than the pressure in the storage reservoir, the check valve closes and retains the air already in the storage reservoir. In addition to furnishing a storage supply, the cylinder containing the air prevents fluctuations in the light, which would result if the air was taken directly from the train pipe to the curburetters. The capacity of the storage reservoir is such that with 60 lbs. pressure in the air-brake service, the air storage on each car will furnish light for the car from 2 to 6 hours after the car is detached from the train, the variation in the length of time being due to the amount of gasoline in the carburetters. The air-storage reservoir is provided with tank valve at one end, which is normally open, and should only be closed when from any cause it is necessary to shut off the air supply from the closet. From the storage reservoir a pipe conducts the air up into the closet.

In this pipe is also placed a dust-guard for additional security against anything passing with the air from the storage reservoir into the regulator, indicator and safety valve, in the closet. In the closet, fig. 3, on the pipe from the storage reservoir is the closet valve. This valve controls the connection between the reservoir and carburetters. When it is open, air passes into the carburetters. When it is closed, air is cut off from the carburetters.

The trainmen observe the indicator at the end of each trip, when the lights are in use, and if the carburetters need recharging turn the disk on the indicator box lid with the valve wrench until the words "fill carburetters" appear, and the inspectors or others who have charge of filling the carburetters are governed accordingly.

The regulator, indicator and safety valve are combined in one piece of mechanism, shown in fig. 10. The regulator is made to open and close as the air pressure varies on the mercury in the cup of the apparatus. This combined regulator, indicator and safety valve is placed in the closet above the closet valve and from it the pipe carrying the air goes to the carburetters. The air pipe runs along nearly the whole length of the car and has a branch leading to each carburetter.

The carburetter, figs. 5 and 6, is a circular flat box having within it a spiral chamber about 40 ft. long, completely filled with cotton wicking. The air inlet to the carburetter is near the centre; the outlet is near the edge. The air which is to pass into the carburetter is taken through a small copper pipe, which is bent in the form of a conical spiral and placed in the flue directly above the lamp. The object of this spiral coil is to heat the air before it enters the carburetter by the heat of the lamp, and in this way to furnish the heat that is necessary to vaporize the gasoline and generate the gas. As a further means of furnishing heat to the carburetter, it is surrounded with an air space, which communicates with the inside of the car, so that warm air from the car constantly passes around the outside of the carburetter and out through the ventilator. Both the ventilator and the cover of the mantle which forms the visible outside portion of this warm air space are detachable and may be taken off as occasion requires. When the carburetters are freshly charged, or when the air is very warm, there is a possibility of carrying too rich a gas down to the lamps; to obviate this difficulty, a permanent cross connection is made between the air inlet to and the outlet from the carburetter. In this cross connection is a diaphragm with a very small hole, so that a small amount of air is taken across to the gas as it comes out of the carburetter, diluting it a little, and thus prevent-

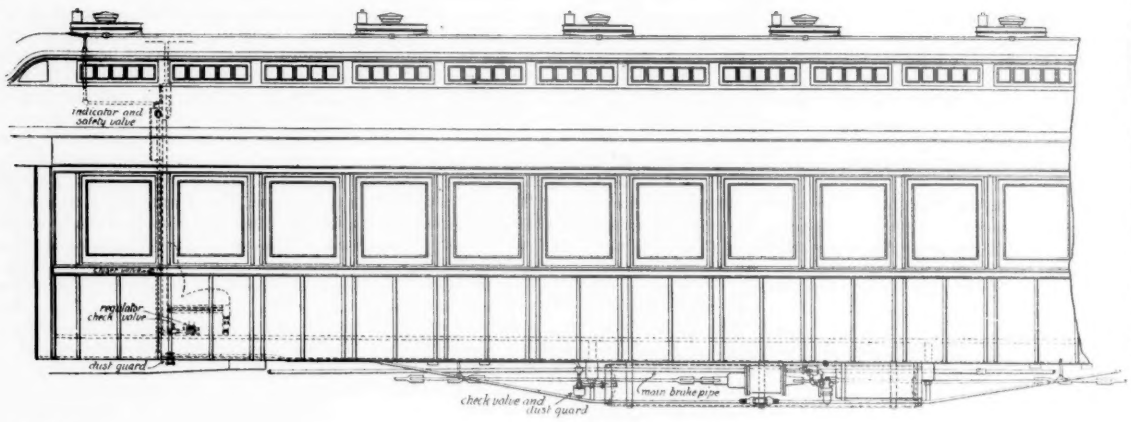


Fig. 2.

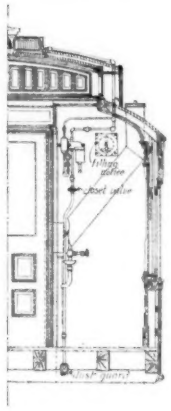


Fig. 3.

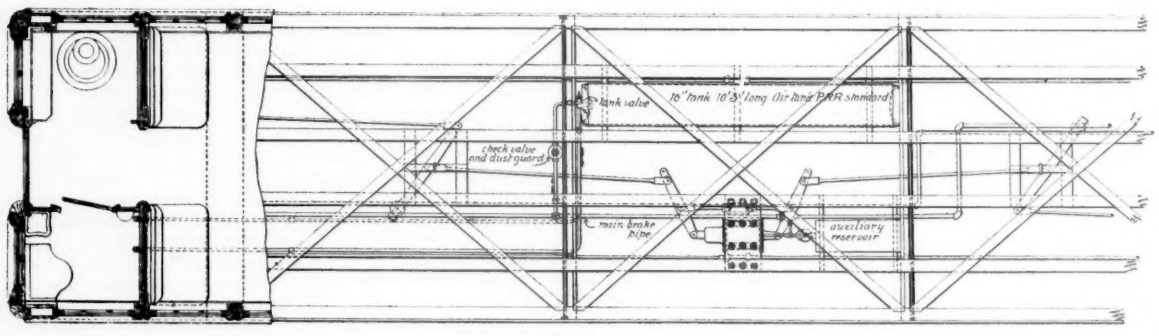
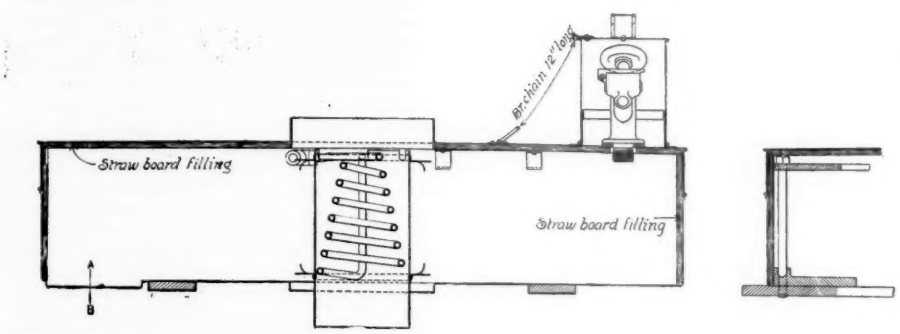


Fig. 1.



Fig. 4.



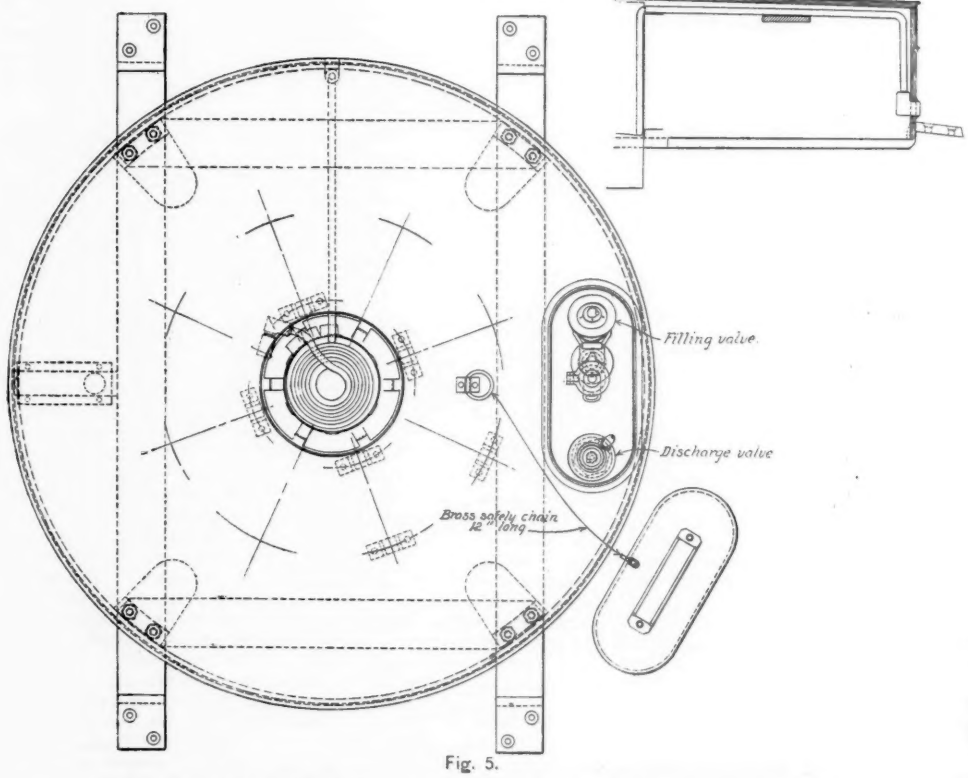


Fig. 5.

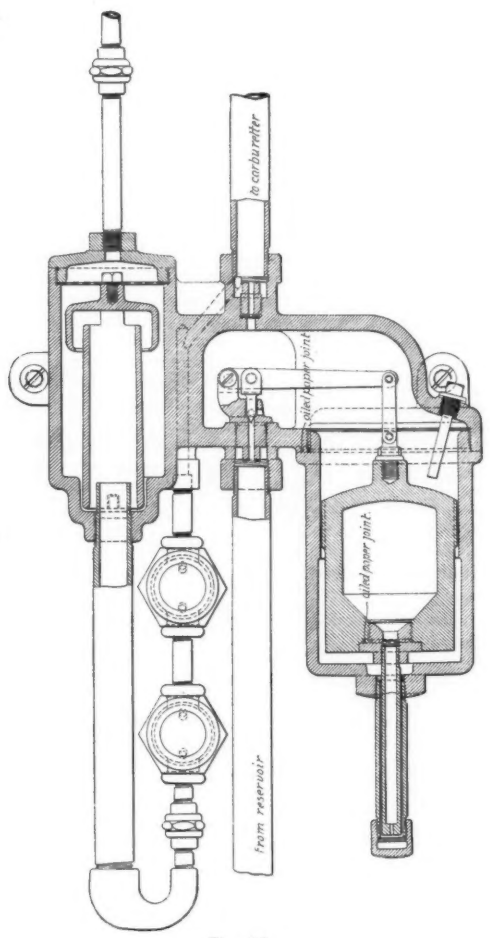


Fig. 10.

THE FROST DRY CARBURETTER AS APPLIED ON THE PENNSYLVANIA RAILROAD.

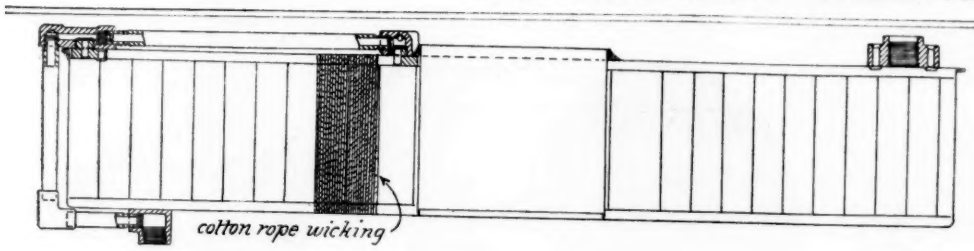
ing any possibility of too rich or smoky a gas reaching the lamp.

From the carburetter the gas passes down through one of the arms of the lamp to the burner, fig. 7. Each lamp is provided with a needle valve to regulate and shut off the supply of gas, and this valve is provided with a locking device, so that it cannot be opened until the clear glass bowl surrounding the burner is lowered. The air to support the flame is taken in at the top of the lamp and passes down beside the chimney, by which means it is heated somewhat, so that to a certain extent the lamp is regenerative. To light a lamp it is necessary to open the glass bowl, raise the chimney, open the needle valve about one-sixth of a turn, which will usually furnish sufficient gas for lighting, and apply a lighted match at the top of the burner, then replace the chimney and close the clear glass bowl. It is advisable in lighting up not to start with a flame more than one inch high, as the flame increases as the carburetter becomes warm.

When the lights in a car are to be put out the closet valve should be closed; then the needle valve on each lamp is closed. It is quite essential that the lamps should all be burned alike.

On the top of the carburetter by the side of the ventilators are located the charging valve and discharge valve. The carburetters being closed tight and filled with gas at all times nothing will enter in unless some provision is made for a corresponding amount of gas to run out, and to permit this is the object of the discharge valve, which is fitted with a hose nipple. The charging valve is to receive the spout of the charging can.

The charging can (fig. 8) holds about 2 gallons, and is provided with three openings. One opening is closed with a screw-plug, which is removed when the can is to be filled. The other openings are closed by means of plug cocks. In



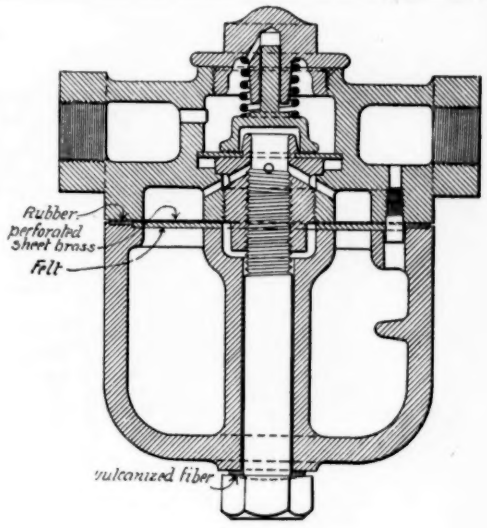


Fig. 9.

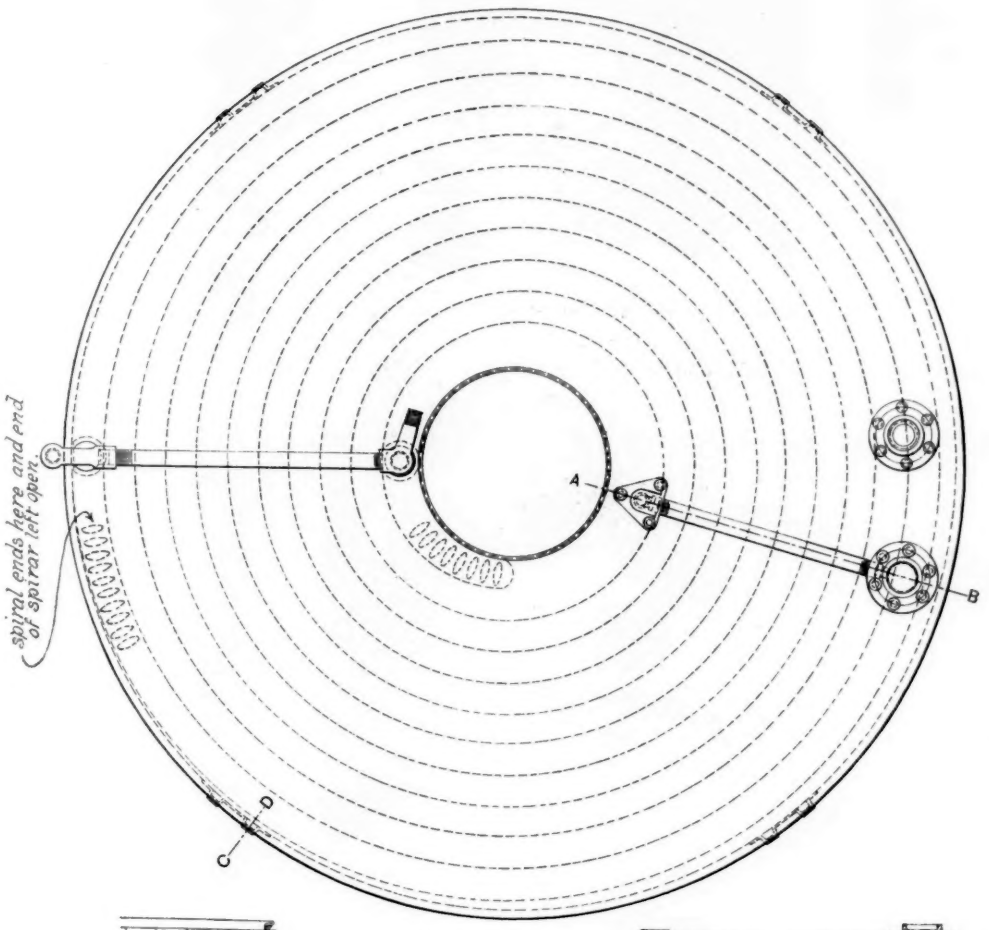
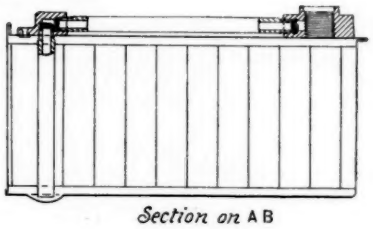


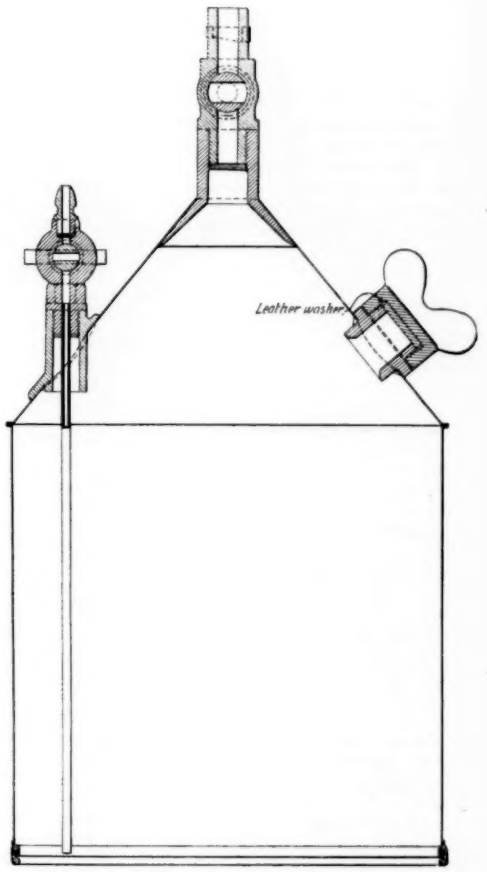
Fig 6.



Section on CD



Section on AB



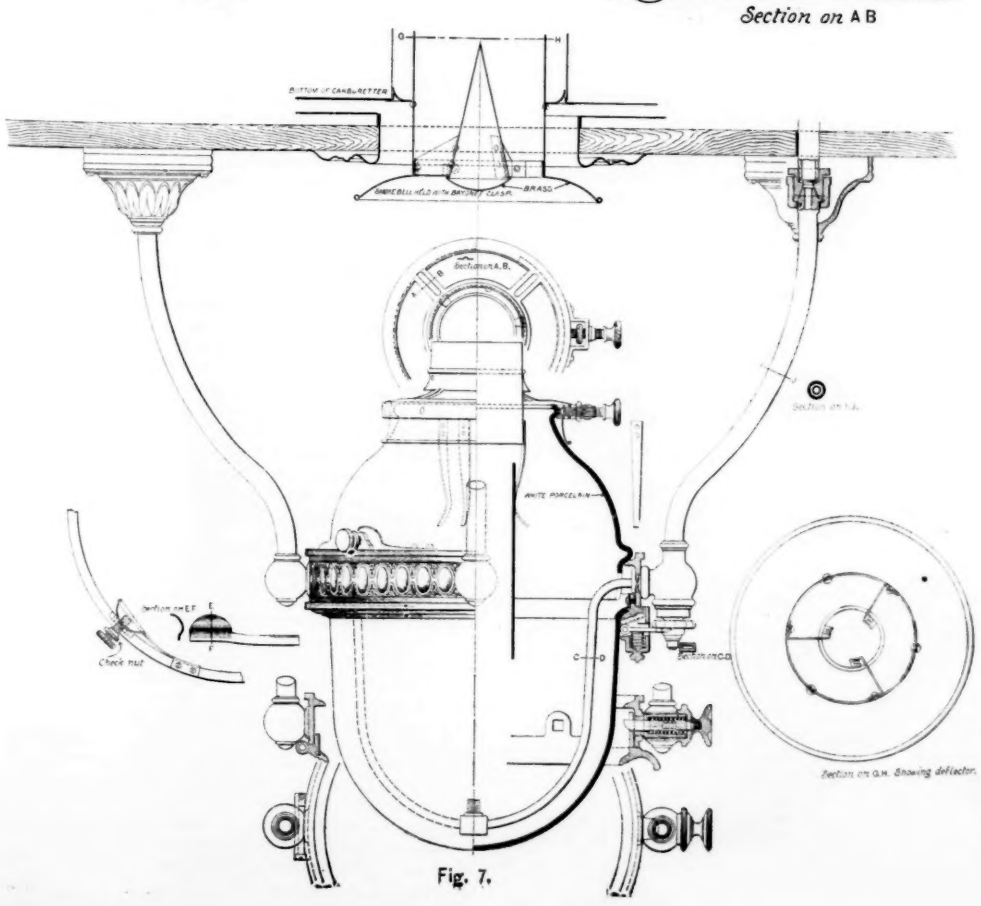


Fig. 7.

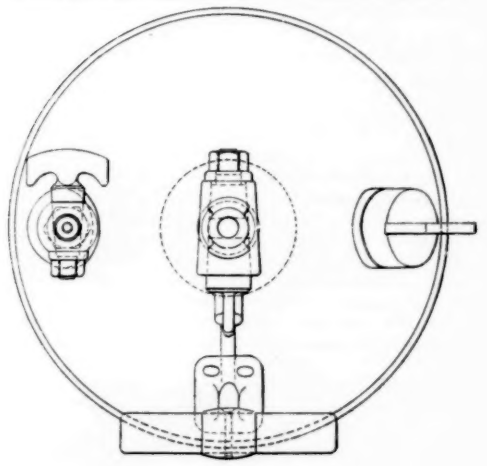
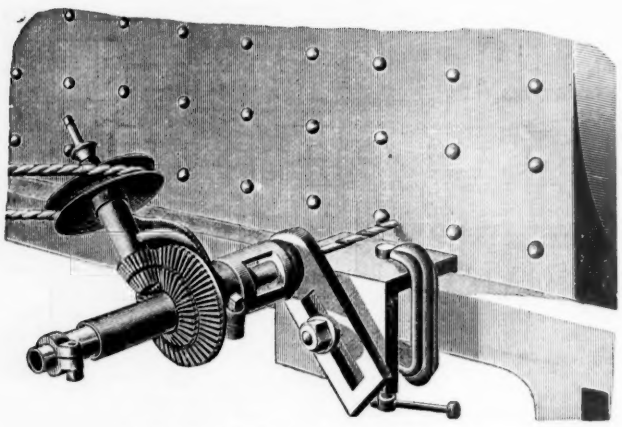


Fig. 8.

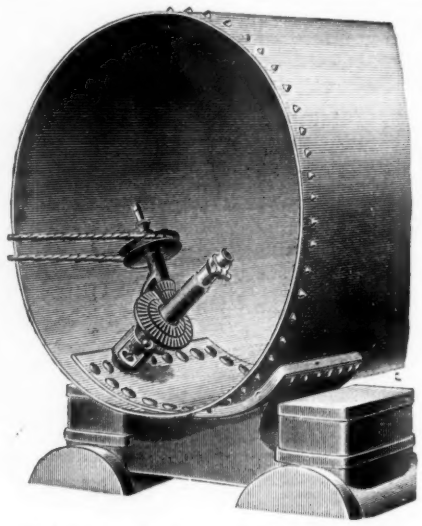
THE FROST DRY CARBURETTER SYSTEM.

charging the carburetter all openings in the charging can are first closed; the can is then turned bottom upward and the central opening is inserted in the charging valve on the carburetter, a slight turn to the right is given to the can by which it is held in position and a gas-tight connection made with the carburetter. A short piece of rubber hose is then slipped over the hose nozzles on the carburetter discharge valve and can respectively. The discharge valve on the carburetter is then opened, next the cock on the can, which is connected with it by the hose, then the charging valve on the carburet-



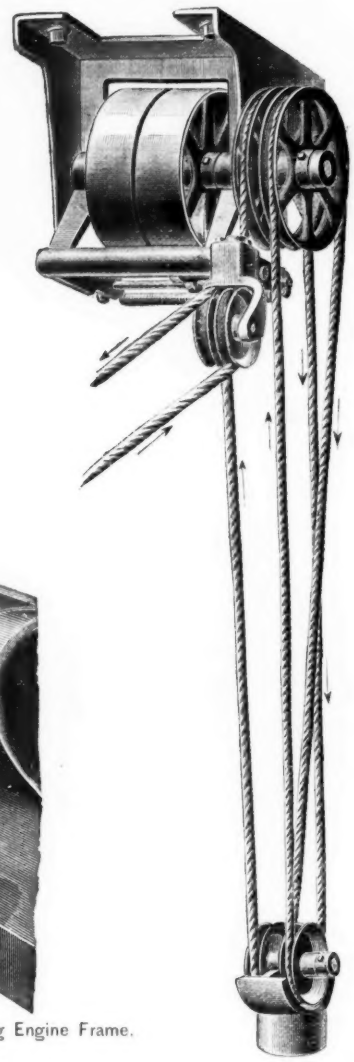
As Applied to Drilling in Locomotive Fire-box.

Fig. 2.

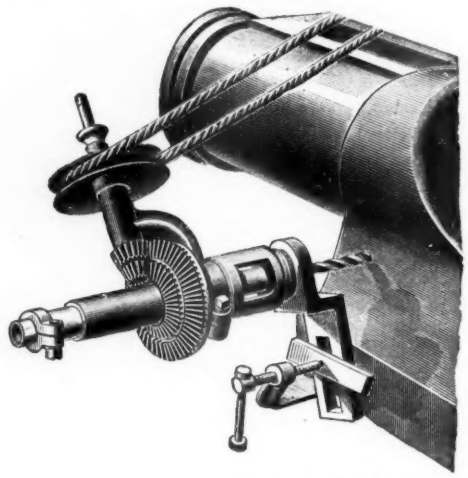


As Applied to Drilling in Smoke-box, by Jig.

Fig. 3.



HALSEY'S PORTABLE POWER DRILL.



As Applied for Drilling Engine Frame.

Fig. 1.

er, and finally the charging cock on the can. The gasoline flows down through the cock and valve into the carburetter and the gas in the carburetter passes up through the valve, the rubber hose, the cock and the small pipe into what is now the top of the can, above the gasoline, replacing the latter as it flows out of the can. The arrangement of the pipes inside the carburetter is such that when the carburetter is fully charged no more gasoline passes in, although it may not have completely run out of the can.

Halsey's Patent Portable Power Drill.

This is a tool intended for use in any place where an ordinary ratchet drill can be employed. It is driven by rope-gearing, as illustrated in fig. 1, the rope being counterweighted in the usual manner, the driving-sheave being adjustable for an angle of about 50 degrees in a horizontal plane, and the driven sheave swiveling on the frame of the drill, having a clamp to secure it in any desired position. The drill has an automatic feed and quick return motion.

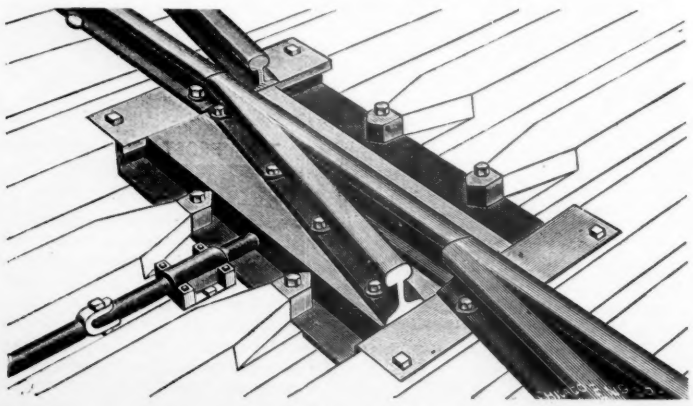
The frame of the drill has a coarse thread on the bottom for attaching it to a clamp, as shown in fig. 1. This frame is hollow, so that bushings can be fitted to guide the drill, if required; and is slotted to allow a view of the drill and to remove borings. An arm secured by a clamp to a finished portion of the frame, carries the rope-sheave, which is rigidly attached to the pinion-shaft of the drill-sleeve, and is connected by a clutch coupling to the pinion-shaft of the outer sleeve. The drill-sleeve has a feather, fitting a slot in the drill spindle, so that this spindle, which carries the drill, revolves with the sleeve, but can move up or down through this sleeve. The drill-spindle can be pulled out when necessary for changing or sharpening the drill.

The large pinion drives a gear-wheel which is rigidly attached to the drill spindle, and the small pinion drives a gear-wheel connected with the outer sleeve. Another sleeve is screwed into this outer sleeve and secured to the drill-spindle by a clamp, as shown. The pinions are so proportioned that the small gear-wheel revolves faster than the large one; and the effect of this, when the tool is operated, is to screw up the outer sleeve upon the inner one; and as the latter sleeve is clamped to the drill spindle this action feeds the drill into the work. To stop the feed, the clutch-coupling of the small pinion is thrown out of gear by the knob, shown outside of the driving sheave, thus causing the outer and inner sleeves to revolve together.

This tool weighs about 50 lbs., and will drill holes of $1\frac{1}{8}$ in. diameter, with a feed of 6 in., but a longer feed can be obtained by running up the drill, so that the screw-feed will operate anew, loosing the clamp of the inner spindle, and securing it again after lowering the drill. To run up the drill the driving rope is removed from the sheave, crossed and put on again; the clutch coupling is thrown out of gear, and the revolution of the sheave reverses the feed rapidly.

The application of this tool to different kinds of work is greatly facilitated by the screw thread on the lower part of the frame. A few applications are here shown; with clamps, in figs. 1 and 2, and with a jig, fig. 3, having threaded holes for attaching the drill.

This apparatus is manufactured by J. J. McCabe, 121 Liberty street, New York.



THE HOYT FROG

The Hoyt Frog.

This frog consists of a rolled steel case, 26 in. wide and 3 ft. 10in. long, the end pieces 5 in. wide, being $1\frac{1}{4}$ in. thick. In this case runs a sliding plate of rolled steel, one inch thick, tongued to fit grooves in the ends. This plate is 3 ft. long by 16 in. wide. On this sliding plate is fastened the frog proper. As shown in the cut, the frog is set for the main track by a rod connecting with the switch stand. On the base plate on each side are two steel lugs, at which the sliding plate stops.

To secure smooth running of the sliding plate small vertical rolls are introduced in the ends.

The Griggs Electric Air Signal.

This is a device intended to furnish a means of communication from the train to the locomotive cab which shall be prompter and more efficient than the bell cord and gong. The system as here shown is the result of some months of trial on the Wilmington & Northern Railroad between Wilmington, Delaware and Reading, Pennsylvania. The system is operated by opening and closing a small plunger valve by a special form of electro magnet, the valve admitting air for blowing a small whistle, the time and duration of the blast to be governed by the conductor at will.

The magnet valve and box are shown in fig. 1. The dotted lines on the valve exterior show the air passages, valve and seat. The magnet has a peculiar feature as shown, which is new. Instead of having the ordinary flush face, the core is made with ears rising at a slight angle the purpose of which is to decrease the traverse of the magnetic field, bring the armature within very close play of the iron, at the same moment giving all the needed travel to open the valve at the smaller lever end. The advantage gained is to greatly increase the efficiency of the system, as the magnetic field decreases as the square of the distance between armature and magnet core. The wires at the bottom of the box are the terminals of the magnet.

The coupling, fig. 2, is of the plunger type, made of hard rubber and of spring brass. This part is subject to severe use, as it is hung below the platform, and it must be well protected from dirt and moisture. In this design the plungers are made pene headed, and operate as shown in the section. By reason of the pene head expanding the interior of the female, it is kept constantly bright by the pene compressing when making and breaking contact. This is vitally necessary, and it is said that this coupler has shown itself capable of insuring good contact at all times. The interior pin has a tongue fastened to it, as shown, that joins the over-lapping ears when the coupling is made and broken. This automatically makes contact and blows the signal. This occurs either when the coupling is pulled apart violently by the coaches breaking or in making up a train, apprising the engineer to try his air.

The contact pull, fig. 3, is placed over the door, connected at one end by a cord which runs to the rear end of the coach, and by a short end to the hood in front. Pulling either end dips the plunger in against the contacts and closes the circuit across, making a multiple connection with the line underneath the coach with which it is connected. The connecting wires pass up through the water-closet. By reason of the metallic springs rubbing against the plunger the ends are kept constantly bright and in operative condition.

The battery is of the Gassner type of dry battery, which has been tried for four months by the Griggs Co., accurate measurements having been taken at different intervals and no deterioration having been found in that time. The eight cells are worked through a resistance of 27 ohms, insuring long life. This battery will be guaranteed for two years and can be recharged at the end of that period. It is placed

in a tray box under the running board on the engineer's side and spring contact with the line is made automatically in placing the tray into position.

Facing the platform the connection of the wires is placed to the left of the draw-head, which position leads the couplings across the air hose at right angles. The wiring runs from thence to the left cell, for the entire length of the coach is covered and lagged and protected from the weather, and any ill usage to which it would necessarily be exposed by being hung in suspension or held by cleats to the car underneath.

The operation of this signal is said to have been very satisfactory in the service which it has undergone.

The Hinson Coupler.

The latest form of the Hinson coupler, as shown by the illustration herewith, embodies some special features. This device differs from all other couplers of the M. C. B. type in the construction of the knuckle and locking device.

The face of the knuckle is hollowed out to form a link pocket, leaving the strength of the metal for buffing purposes as nearly intact as possible. This pocket allowes 6½ in. for the link, and upon reaching that limit a back-stop is formed by the back portion of the knuckle. The locking device is pivoted from the top and swings to position automatically.

Malleable iron is used in the construction of this coupler

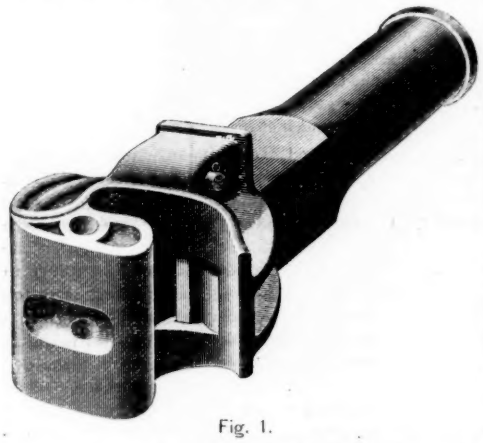


Fig. 1.

throughout, and no case of failure has yet been reported. The knuckle fits into the draw head and is pivoted on trunions, thereby dispensing with the hinge pin.

The uncoupling device is placed under the car and attached to the draw-bar itself, so that the chain is not broken by variations in the position of the coupler. Of the various claims made by the inventor of this coupler, one which is regarded as quite as important as any is that of safety in coupling with old style draw-bars.

The Hinson coupler is made on the M. C. B. lines and conforms to all requirements in this regard. It is in use by 17 different companies and as an instance of the satisfactory results obtained in actual service it may be mentioned that one company has within the past few days placed its fifth order, which was also its largest. This is after a test of nearly two years. An examination of the couplers in use over one year revealed no broken parts and no wear. The first pair of Hinson couplers placed upon a car are still running in good order and will be shown on the car at the forthcoming conventions. Any futher information may be obtained by applying to the Hinson Coupler Company, The Rookery, Chicago.

THE SCRAP HEAP.

Railroad Directors in China.

It appears that in China railroad directors are expected to direct. Ng Choy, Managing Director, is to have three "black marks," and Yang Koc-shan and Yen Yu-fang, Directors, have two black marks set against them on account of the recent collision on the China Railway, in which 15 persons were killed. The heirs of the deceased persons receive $300 each, the payment of which seems to be assumed by the government. What the black marks mean we do not exactly know. They are imposed by Viceroy Li, who, in spite of his name, is certainly acting in the interests of righteousness in this case.

Ways of Working in a Large Ticket Office.

Mr. M. G. Carrel, Ticket Agent at the Cleveland Union Station, sends to the *Station Agent* the following account of his method of adjusting the accounts of his assistants:

"I have three regular ticket sellers, who work three tricks, or shifts, and are alone at the window except in case of heavy trains when they have assistance in all but making change. I close my day at 6 p. m., and change my stamp at midnight. Each ticket seller has an individual stamp. The night seller takes the window at 6 p. m and is off at 3 a. m., when he makes a report of his sales and a memorandum of his cash, which must agree. All orders for tickets, or rebates, or memorandums, for which he has delivered tickets or paid cash, are in memorandum as cash. His stubs and records are placed in his box and put away. The other ticket sellers do the same. At 6 p. m. the numbers are all called off and placed on sheets opposite their respective destinations. From these numbers and stubs daily reports are made and must agree with the total of the three 'shifts.' Any discrepancy will be shown, as well as upon whom the error rests. The three cash memorandums are then checked and an office memorandum made of the total amount, which must agree with the cash memorandums of the three ticket sellers. All change is sold back to the window and arranged into remittable cash. A memorandum is then made on the same sheet of items brought forward as cash from the previous day. All memorandum accounts of this day are then placed with their same kind of yesterday and are thus the 'Bro't forward' account of to-morrow. Thus no item can drop out and this day's total cash must equal the sales, plus the amount carried yesterday. I can remit quite closely, as I remit in the morning for previous day and borrow from the night man's cash enough to cover the memorandum assets, giving him credit for the same. Each ticket seller's 'over or shortage,' both of which, I assure you, are small, is kept in the memorandum account and settled at the end of each month. If any corrections are made they are placed to the debit or credit of the seller who made the error. Thus, I balance from day to day, and ticket office work is a pleasure to us all.

"My blanks are as follows: First, a large sheet with destinations on left margin, and thirty spaces for the commencing and closing numbers of each day; coupon sheets with blank destinations; card local tickets, written or printed; stub locals in blank. Experience has taught us about the space required for each form. I also use another blank similarly ruled, but with no destinations thereon, it being headed to correspond with the large sheet, on which are extensions of number of tickets and amount of cash for each destination. This has seven spaces for the days of the week, and weekly (the weekly report I now make on a large sheet having five spaces to the extreme right thereof) the footing of this weekly report checks and balances the daily report. (I run Sunday and Monday together.) Finally the footings of the weeklies and the check on monthly reports. I find by this system that monthly report making is but little more work than daily, as it all rounds up together. I should be pleased to give information and samples of blanks to any agent addressing me."

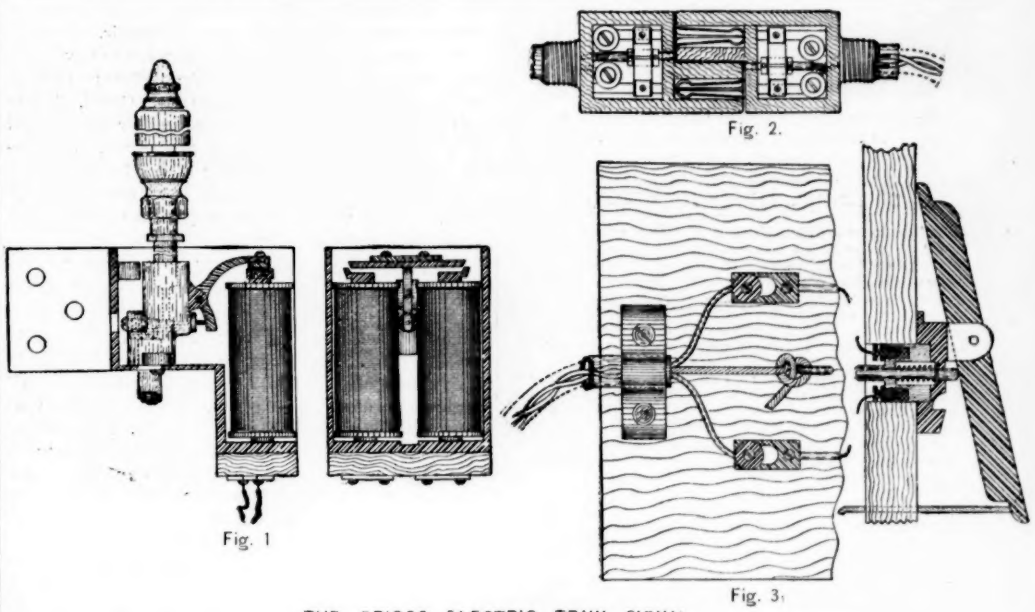


Fig. 1

Fig. 2.

Fig. 3.

THE GRIGGS ELECTRIC TRAIN SIGNAL.

Nomenclature.

The *Railway Register* and the *Northwestern Railroader* are fixing up some changes in railway terms for use both in England and this country; they propose "station" for "depot," "stoker" for "fireman," "car" for "carriage," and "*locomotor*" in place of "engine driver" or "engineer." There is about as much sense in calling a locomotive engineer a mocolotiveer executioner, a locotitioner or a billy-goat as a locomotor. If any change were possible from the English "driver" or the Yankee "engineer," it should be "locomotive runner," or simply "runner," much used by the men themselves; but even that would be hard to grind into use.—*Locomotive Engineer.*

Found at Last.

A gentleman, for many years a railroad superintendent, has had a happy thought. He has invented a time lock attachment for toilet room doors for use in sleeping cars so that when a lady has occupied the dressing room in the morning more than an hour to the exclusion of perhaps half a score of her fellow lady travelers, the door will automatically fly open.—*Exchange.*

The Speed of Detonations.

Mr. C. Napier Hake, F. I. C., in a paper read before the Society of Chemical Industry on Explosion, stated that a dynamite cartridge 1 foot long occupied only $\frac{1}{24000}$ of a second in detonation. At this rate a cartridge 1 mile in length, fired by a detonating exploder at one end, would be consumed in about a quarter of a second.

A High Pressure Turbine.

France claims the honor of utilizing the greatest head of water for industrial purposes at Brignond near Grenoble, with a turbine of 9 ft. and 10 in. in diameter, which has worked since 1875 under a head of 1,638 ft., giving a force of 1,500 horse power, with a flow of 300 litres, or about 10.6 cubic feet per second.

The World's Telegraph and Telephone Lines.

Dingler's Polytechnisches Journal gives some interesting figures relating to telegraph and telephone development recently compiled by Mr. v. Stephan, of Berlin, Germany, the widely known German post office official. Mr. v. Stephan places the entire length of telegraph lines in the world at 580,140 miles, equal to about 26 times the earth's circumference, the length of wires amounting to 1,634,400 miles, or about 80 times this figure. Of these 580,140 miles 215,100 miles are located in Europe, 170,460 in America, 48,750 miles in Asia, 25,212 miles in Australia, and 12,564 in Africa. Aside from these lines we must consider the different cable lines, of which there are, altogether, 950. Seven hundred and seventy-four of these cables, embracing a length of 12,132 nautical miles, are in inland European waters and are under Government control. The great ocean cables, 176 in number, and 100,569 nautical miles long, are worked by private companies. Of telegraphic instruments in service there are altogether 160,000.

In the matter of telephone transmissions Mr. v. Stephan gives the city of Berlin the distinction of heading the list as regards extent of lines. In the German Empire, there were, according to his figures, 164 telephone stations at the end of 1887, the number of instruments in use being 31,325, and the length of wires 27,112 miles. These figures, however, are exceeded in the United States, where the number of stations is placed at 739, and the number of instruments at 158,712. So far as the large cities are concerned it is of interest to note that Berlin is credited with having in use 10,000 instruments; New York, 6,902; Paris, 5,330; London, only 4,596, and Vienna, 1,200. Austro-Hungarian statistics would appear to show that in that country there are 4,200 instruments; in Belgium there are 4,674; in Denmark, 1,837, and in Spain, 2,218. Of this last number Madrid has 1,242. In France, we are told, there are only 28 telephone stations, or more correctly, 26, two of the stations being located in Algeria, the whole connecting with 9,487 instruments. Great Britain has 122 stations, with 20,426 telephones in use; Italy, 28 stations and 9,183 telephones; Norway, 21 stations and 3,930 telephones. The Netherlands embrace 9 stations with 2,872 telephones, and Portugal has only two, at Lisbon and Oporto, with 541 and 349 telephones respectively. In Russia there are 36 stations serving 7,589 telephones, of which number 1,500 are at St. Petersburg, 840 at Moscow, 700 at Warsaw, and 700 at Odessa. Sweden has 137 stations, with 12,864 subscribers. Switzerland, finally, boasts of 71 stations and 7,626 subscribers, distributed as follows: Geneva, 1,533; Zurich, 1,066; Basel, 929, and Lausanne, 544.

Signs on Freight Cars.

The Northwestern *Lumberman* condemns the placing of business cards on freight cars, declaring it unfair as between competitors, and adds: If railroad corporations were to exact a charge for the privilege of doing such advertising, we would see few sign boards or posters in the near future. It is only because it is a purloined privilege that makes a few persons apparently enjoy it to such an extent.

The International Railroad Congress.

The Department of State at Washington has been officially informed that the third annual session of the International Railway Congress will be held at Paris during the second fortnight of September next.

Pennsylvania Relief Department.

The volunteer relief department of the Pennsylvania lines west of Pittsburgh went into operation June 1. Its officers are: R. F. Smith, Superintendent; F. C. Thayer, formerly of the auditing department, Assistant Superintendent; Dr. G. D. Arnold, Chief Medical Examiner. Headquarters are located at Cleveland. Benefits and assessments do not accrue until July 1, but the department is now organized, and at any time during the present month applications for membership will be received.

Fleeting Joys.

The temporary character of advantages secured by manufacturing establishments in the reduction of freight rates on raw materials is well illustrated by recent occurrences at Pittsburgh. The rate on Lake Superior ore from Cleveland was reduced after a long and hard fight between the consumers of ore and the railroad authorities. The reduction was small, but it was regarded as very important by those who used large quantities of ore, and they were very well pleased at the prospect of even this saving in the cost of manufacturing iron. But they had a very short season of rejoicing, for immediately their trade rivals in other iron-producing sections insisted on a corresponding reduction in coke rates to enable them to compete with the Pittsburgh manufactures. They will probably get it, the balance will be restored to its former equilibrium, and neither set of manufacturers will have any advantage over the other.—*Iron Age.*

The Chesapeake & Ohio Canal.

A Baltimore dispatch of June 2 says: The Chesapeake & Ohio Canal, running from Cumberland, Md., to Georgetown, D. C., a distance of 184 miles, is by the unprecedented rise in the Potomac wrecked beyond repair. President John Quincy Adams began the work in the presence of Congress. It cost nearly $12,000,000 to build. It has never been productive, and it has sunk for the state of Maryland in principal and interest over $15,000,000. It connected the bituminous coal region of Maryland and West Virginia with tidewater. It has been a factor in the politics of the state, and its finances have long been on the verge of bankruptcy.

The canal was the first great work of its kind in this country. George Washington was its projector. As early as 1794 he secured the passage of a law by the legislature of Virginia for the opening of the Potomac to navigation, but it was not until 1830 that the work was pushed with vigor. The real commencement of the work was on July 4, 1828, when President Adams broke the ground. Twenty-two years were spent in its construction. In the 184 miles it has a total rise of 609 ft. A part of it goes through a tunnel that cost $2,000,000 to construct.

The floods of Friday swept away embankments that cost thousands of dollars. Most of the locks are gone, and the canal and the Potomac River for long distances are now practically one body of water. Many canal boats are swamped and about 10,000 tons of coal were caught en route and washed away. President Gambrill says that it would take from $500,000 to $1,000,000 to repair the canal, and it is virtually gone as a waterway.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

No reasonable estimate can yet be formed of the loss of life and of property in the terrible flood which last week swept over a great region on both slopes of the Alleghanies. Elsewhere we have collected such news as the press dispatches give of the losses to the railroads. Private sources of information are almost unavailable because of the interruption to mails and telegraphs, and because those from whom we should ordinarily get information are overwhelmed with work. Naturally, the terrible loss of life at and near Johnstown has so engrossed public attention that the extent of the calamity elsewhere, and especially on the eastern watershed, is not yet generally realized. As we go to press it is estimated that from 12,000 to 15,000 people have perished in the valley of the Conemaugh, and several important towns are almost obliterated. Were that all, the disaster would be one almost unprecedented in history; but leaving out of the account all that took place on the western slope of the Alleghanies, the destruction of property on the eastern slope would alone make this one of the most serious calamities since the nation began. It will be a long time before the value of property actually destroyed can be known, and still longer before the loss from interruption of business can be estimated, but it seems probable that the losses when finally footed up will be found to have been exceeded only by those of the Chicago fire, where $200,000,000 was destroyed, and of the Boston fire of 1872, which amounted to about $80,000,000. All of the railroads from Elmira, N. Y., to the Potomac, and even further south, have suffered, but the loss of the Pennsylvania is much the greatest. The damage to the latter line in the valley of the Juniata must be enormous. Many bridges are gone, and it is thought that the damage to the roadbed will in some places necessitate a relocation. So far as can now be known the beautiful stone bridges on that part of the line have stood well. The company is rapidly sending forward material and men for temporary repairs, and is said to be arranging a through line by way of Williamsport, Lock Haven and the Bald Eagle road; but the damage to that line is great, and it appears likely that the delay in getting regular train service through will be greater than has been anticipated. The sympathy of the whole civilized world is stirred for the thousands who have perished in the flood, and by the sufferings which the survivors have endured, and must yet endure. This great disaster will be forever memorable for the loss of human life rather than because of the destruction of property, but the damage to the railroads has a sentimental side also. Some of the finest track in the world, track into which have gone years of conscientious and enthusiastic work, has been ruined beyond repair. Every one who loves to see good engineering must feel something like real grief at the destruction of so much of its results.

The South Fork Dam.

From the meagre information now at hand it is hardly possible to determine exactly where the responsibility for the Johnstown disaster lies. Enough data have been secured, however, to enable a very close approximation to be made to the real cause of the destruction of the South Fork reservoir.

The dam which broke away appears to have been built about 1840 by the State of Pennsylvania to store water for feeding the old Pennsylvania Canal. A few years ago the reservoir passed under the control of a number of Pittsburgh gentlemen, composing the South Fork Fishing and Hunting Club. With the reservoir was acquired a tract of 20,000 acres, which was held as a pleasure ground and game preserve by the club.

From the statements published in Philadelphia journals, purporting to come from members of the South Fork Club, it appears that after the canals had abandoned the reservoir, the dam was partly broken away. According to the statements made at the meeting of the American Society of Civil Engineers, elsewhere given, it is plain that the dump seen in progress by Mr. Brendlinger and the defective culvert masonry at the bottom were carried away, as might have been expected. The connection of old and new work is one of the most delicate and dangerous operations in hydraulic engineering, and in this case there is no doubt that sufficient attention was not paid to the security of the foundations and the bonding of the old work with the new. How difficult it is to get such work intelligently and well done even where the action of water does not enter into the conditions of the problem, may be seen from the present condition of the buildings in Wall street in this city, adjoining the great new building of the United States Trust Company, which has settled several inches, pulling down the buildings on each side, cracking the solid stone window sills and lintels from top to bottom and throwing the floors out of level. If this is the case in New York city, with buildings constructed by architects and builders of repute, for corporations of unlimited resources, it may readily be supposed that a club of gentlemen who were ready to expend any amount of money for their personal pleasure, but would feel it a duty to make the closest bargain possible in a matter of business, would skin down the expenditure on a dam and avoid paying for professional advice, preferring to put the whole matter in the hands of a "practical" man, who on his part would do the least work for the most money he could get out of it. There seems to be no doubt that the dam has been leaking for several years, and that apprehensions have been entertained by some persons who were most familiar with it that it was not safe.

The clearest and most circumstantial account of the breaking away of the dam, which has appeared in any of the New York papers, is the one furnished to the *New York Times*, over the signature of F. de F. Folsom, June 4, and the intrinsic probability of the correctness of this statement is so strong that we feel warranted in accepting it as correct, in the absence of any contradictory evidence. It is based upon information furnished by a man named Herbert Webber, who was employed by the South Fork Club as a sort of guide and guard on the premises, who supported himself mostly by hunting and fishing on the preserve.

He said that the leakage at the dam had been increasing recently to a great extent; that he had called the attention of members of the club to the leakage, but they laughed at his warnings; said that failure was impossible; and finally told him to shut up or he would be bounced. This is so perfectly natural a statement that we cannot help believing it. The day of the break Webber was some distance up the lake, when he noticed the water falling. He went at once to the dam and found the water coming out below the foundation in great volumes. Then a section of the face wall at the bottom gave way and masses of earth and water rushed out and then the grand burst came. This is just what might be expected from a rubble wall poorly built, on an insufficient foundation, and backed with earth not properly compacted. The statement that the water rose at first about a foot over the crest of the dam is consistent with this account, for the overflowing water would wash out the earth at the toe of the wall and put it into the condition in which Webber says he found it on his arrival.

Nobody seems to know the area of the water-shed above the dam, and without this knowledge it is impossible to form any judgment as to the proper width of waste way which should have been provided. The width of 75 ft. was evidently too little for the contingency which actually occurred. It is likely that there was an embankment of better material back of the dump which was used to fill the gap and the dam was probably able to stand any ordinary freshets; but the waste water channel being insufficient for this flood, as soon as the water rose over its top and the overfall undermined the toe, it was doomed. As the American Society of Civil Engineers has appointed a committee to investigate the causes of failure, it is wiser to suspend judgment as to the responsibility for the disaster until that committee reports. It is composed of some of the ablest men in the society, and three of them are hydraulic engineers of distinction. We may be sure that their verdict will be one that can be accepted as final.

Safety in Car Lighting.

Elaborate illustrations are given, on another page, of the "dry carburetter" system of lighting as applied to the cars of the Pennsylvania Railroad. The system has some obvious advantages. The light is brilliant, the system of charging is simple in the extreme, no "plant" being required other than a two-gallon can, and the light is very cheap. The plan of lighting, as developed by the Pennsylvania, insures fair ventilation while the lights are burning, by the outflow of air around the carburetters. The one objection which is raised is the possible danger, for gasoline, carelessly handled, is a most dangerous substance. In view of the certainty that the system will be considerably used, it is well to inquire into its possible dangers.

The public is chiefly concerned with the dangers to trains. The dangers to buildings have more interest for the railroads and insurance companies.

The first danger to trains to be anticipated is that of conflagration or explosion in case of a wreck. If cars are lighted with kerosene lamps this danger is always present. If a compressed gas system is used we have held that there is practically no such danger. The chances of the gas getting into and being confined in a wrecked car to form a dangerous mixture seem too remote to be seriously considered, and the gas from a ruptured tank would be dissipated instantly, with but a trifling chance of doing any harm. With the dry carburetter, a wick saturated with gasoline is packed in a spiral chamber, inclosed in a case of copper, with brazed joints. In a wreck this case might be deformed, but would scarcely be ruptured, and if it were ruptured there is little chance of fire coming near the wicking charged with gasoline. The burners in the car would be extinguished by any shock that would break the carburetter, and were the car set on fire from any source other than the lights, whatever damage could be done by fire would be done probably before the gasoline in the carburetters could add anything to the flames. This element of danger does not appear, therefore, to be serious. It would be safer to have no inflammable material about the car, but in making a choice of systems this consideration of the danger of fire from the gasoline in a wreck would be a minor one.

Very careful instructions are given to the trainmen as to the order of proceeding in putting out and lighting the lamps. These instructions are so minute and so emphasized as to have excited alarm. The object of them is, first, to prevent the accumulation of gas in the lamp while it is not burning, and second, to prevent lighting a body of gas so accumulated. It is said that local explosions might be caused by carelessness in these operations "which will probably break the lamp and may cause serious injury to the operator, as well as to the passengers and the car." The language of the instructions in this particular is unduly alarming. If the valve between the lamp and carburetter is not closed, but the light is allowed to burn out after the air is shut off, the elasticity of the air remaining in the carburetter will cause gas to accumulate in the lamp. Again, careless manipulation in preparing to light will cause unconsumed gas to gather in the lamp. Carelessness in lighting would ignite this body of gas and cause an explosion sufficient to scare people, and perhaps to injure them by pieces of falling glass. It could hardly, however, be grave enough to warrant condemnation of the system. The chances of serious injury from such an explosion would be a little greater than of injury from a broken kerosene lamp chimney. Explosions of this sort would be unpopular and disagreeable, and, of course, the railroads using the system wish to avoid them. This is easily done by following the directions. The heavy gasoline gas falls when the glass bowl beneath the lamp is opened, and flows out harmlessly, but, of course, that which has gathered in the chimney does not escape. For this reason the operator is directed to raise the chimney and light at the burner, and not at the top of the chimney. It will be seen at once what the measure of this danger is, and how easily it can be avoided.

The chance of dangerous leakage from the carburet-

ters does not seem serious, as the gasoline is held suspended in the wicking, and provision is made against overcharging.

The danger arising in handling the material and in charging is of but indirect interest to the traveling public. The precautions prescribed, that carburetters should not be charged while lights are burning, or while cars are in stations, and that barrels of gasoline should be stored in cool places, are those which any prudent householder adopts in the use of kerosene, and such as should be used with any car lighting system. The operation of charging the carburetters with the apparatus provided is simple and hardly to be considered dangerous. Doubtless it is required that it should be done while cars are standing outside of the stations chiefly because of the odor. Any one who passes often through stations in which car tanks are filled with gas, can testify that a similar rule should be observed by roads that light with compressed gas.

On the whole, a fair statement of the relative safety of various systems of car-lighting now in use would place them in the following order, beginning with the safest: Electricity, Pintsch compressed gas, Frost dry carburetter, kerosene. Examination of the dry carburetter system convinces us that it is not so unsafe as to warrant its rejection when its advantages are considered. This conclusion is supported by the fact that a company celebrated for the pains taken to secure the comfort and safety of its passengers, and for the skill of its mechanical staff, has adopted the system after long and very thorough experiment. This fact, of course, should not be conclusive, but it must have weight.

Southern versus Northern Lumber.

The proposed reduction of rates on lumber from Chicago to Missouri River points which we alluded to in our last issue has a wide importance not fully recognized by every one. It involves a conflict between Northern and Southern producers, as well as between different principles of railroad economy. The telegraphic summary hardly touched upon the more serious questions connected with the subject. Even the able opinion of Commissioners Walker and Midgley, of which we this week publish an abstract, by no means exhausts the difficulties.

Few men, outside of those immediately connected with the traffic, appreciate the importance of lumber business to railroads. Next to coal and grain, it is the article which furnishes by far the largest proportion of tonnage. It has been less talked of than grain or coal or many other articles, because no sectional questions have come up prominently connected with it. But such a question has now arisen. The shipments of lumber to Missouri River points, which have always been rather large, are now more important than ever. The rapid development of Kansas, Nebraska and adjoining parts of the country has caused a great demand for building materials. The demand can be supplied either from the North or from the South; either by the white pine of Michigan, Wisconsin and the Canadian border, or by the yellow pine of Arkansas and the adjoining states. To a great extent, the question of cheapness determines which wood will be used. For a long time the white or Northern pine had the preference, but of late the yellow pine has crowded it out to such an extent as seriously to diminish its use. Naturally enough, the Chicago roads, which depend upon Northern lumber for a great deal of their west bound tonnage, seek to avoid this change by reductions in railroad rates; and just as naturally, the Southern roads object to any such reductions.

The case is an especially hard one to settle, because the ordinary conditions of competition do not exist here. If both sections supplied Kansas City or Omaha with the same product the matter would be comparatively simple. The railroad rates would have to be adjusted in such a way that Northern and Southern competitors should meet on precisely equal terms. If the railroads could not arrange their tariffs in this way one section would control the market and the other would be forced to abandon it. But the case before us is not thus simple. White and yellow pine are two distinct articles; one will not supplant the other wholly. There are some uses for which white pine is clearly much better; there are others for which yellow pine has the advantage. The two things may and generally do bear different prices in the same market. It is only gradually that one will supplant the other, if this inequality in prices becomes too great. The conditions of production and transportation are also different, so that it is hard to discover any principle by which the relative rates on the two articles can be settled.

In point of fact, the rates on yellow pine from Arkansas points to Missouri River, distance for distance, average somewhat lower than those for white pine. In justification of this difference the Southern producers and Southern railroads say that white pine is nearly one-third lighter than yellow pine, and therefore takes up so much more space for a given weight. They might also add that in most markets of the country its price is higher, and that a difference is to some extent justified on that account. On the other hand, the Chicago & Alton, which is the road that most strongly desires a reduction, claims that the special conditions of lumber traffic make it the most valuable means of backloading, and that under these conditions the company can profitably carry lumber at 4 mills a ton a mile. It therefore desires to do so rather than to lose the trade which it has hitherto enjoyed.

This is the shape in which the matter has come before the Inter-state Commerce Railway Association for action. The commissioners of the Association are obviously somewhat puzzled, as well they may be. They have refused to grant the claim of the Alton in the form in which it was presented, although they hint that a slight reduction might still be justified under the circumstances. They admit that it is a hardship for a railroad to lose its traffic. They do not directly deny that the Alton might be better off in carrying lumber at four mills a ton a mile than not at all. They urge, however, first, that such a reduction would quite possibly be met by the roads running from the yellow pine district. In that case the contending parties would be left in the same relative condition as before, but would lose whatever profit is now to be obtained from the lumber trade. They say in the second place that such extremely low rates for lumber as the Alton proposes to make would furnish a dangerous precedent for legislative action. The state authorities in the upper Mississippi Valley are only too glad to seize upon any pretext for forced reduction of rates. If they see roads carrying one kind of traffic for four mills a ton a mile the authorities would not appreciate the special conditions of railroad economy which made this possible. They would argue that if roads could carry some of their traffic profitably at such rates they could treat all of it in nearly the same way. The result of such action, whether by legislation or by state commissioners, would be disastrous in the extreme.

Without denying the force of either of these points, we believe that the arbitrators somewhat exaggerate the danger from both directions, and that they overlook a still greater danger if they refuse to allow the reduction. It has been a fairly well settled principle of railroad economy in the case of direct competition that the shortest route should usually fix the rates, and that other routes, if they wish to compete in a traffic, must adapt themselves to the terms thus fixed. The same principle applies, somewhat less obviously perhaps, but no less fully, to the indirect competition of the different roads in supplying the same market. The distinctive feature of this case simply is that the Chicago & Alton desires to make a lower rate, not on account of a shorter distance, but on account of an alleged chance for more economical handling. We see no real reason why an economy of this kind should not count in the same way as the economy due to the short haul. The operation of the two is a little different, but the principles involved are the same.

If you refuse to adapt the competitive rate to the demands of the railroad which has the best and most economical route, you enter upon a dangerous course. The attempt to force a stronger road to conform its policy to that of the weaker lines makes it lose business which it could handle with some profit, and forms the strongest motive to such a road to withdraw from the association in which its action is thus fettered. Take the case of the Trunk lines. The Pennsylvania, with the shortest route, has been on the whole allowed to dictate grain rates. If an association had refused to allow one of its strongest roads to make a reduction it probably could not have preserved its organization, and it certainly could not have justified its existence from the point of view of public policy. Under such circumstances it would have done what the enemies of railroad associations charge it with doing; it would have destroyed competition wholly and would have prevented such healthful reductions of rates as result from the development of railroad enterprise and railroad economy. We fail to see why the case of the Alton is not an instance in point. If the association prevents it from making as low rates as it wants to, and thereby destroys a traffic which would be really profitable to it, it justifies a public charge against pools. If it be true, as the managers of the Alton claim, that the special conditions of backloading make it good economy for them to do the business, the fact that the Southern railroads would probably make a cut and prevent such a danger from being permanent does not affect the matter in its wider relations to the general public.

To sum up: if the products of two sections are to compete in the same market, there must be at least an approximate equality in price. Where the goods are precisely the same this matter will usually settle itself after more or less friction. Where they are different, as in the case now before us, the affair becomes more complicated. But in this case, as well as in the other, we believe that it is shortsighted policy for a railroad association to deny the right of the road which can do the business with the best economy to make rates to suit itself. We believe that the danger involved in letting the stronger road fix the rates is on the whole much less than that which arises from refusing to allow such independence. The former course may involve a temporary loss of profit and constitute a possible pretext for bad legislation. The latter policy is an immediate menace, not merely to the existence of the association which tries to enforce it, but to the toleration of railroad associations as such.

Concerning Some Causes of Accidents.

In another column a correspondent writes concerning the causes of train accidents, and gives facts from his experience which will be found instructive to those who study this branch of railroad economy. Our correspondent draws sound conclusions from the premises he sets forth, and on the whole his letter is so good that two or three points in it that will bear criticism demand mention all the more on that account. Quite likely he has not lost sight of the points we bring up, and his general conclusions are not particularly weakened by his neglecting them, but even if they are mere omissions from lack of time or space, they still deserve attention.

"Roadmaster" says that a law of the state is no stronger than a rule of the railroad company; that if an employé disobeys a rule he would not be any more or less negligent if that rule were on the statute book. While there may be two opinions on this point, and it remains true that many, perhaps most, of the worst accidents we read of may be treated as resulting from the absence of some well understood rule, it is not because the railroad companies do not enforce it, but that they neglect to promulgate the rule. This is the point emphasized by those who wish laws enacted. They desire the laws not so much for making rules for employés or for enforcing such rules, but as rules for the railroad companies themselves. For example, railroad companies have a rule that telegraph operators must be competent and efficient, but they do not bind their superintendents to a rule excluding boys and girls from the service, nor to one which insists that every operator shall be a clear and legible penman. The number of accidents to trainmen, as well as of wrecks to trains, would be considerably diminished if all candidates for the position of brakeman were required to work a term at freight house or as helpers in yard work before being given places on trains. Men of naturally careless habits could be weeded out before instead of after they lost arms or legs. Likewise, the passenger train service would be improved if all the men were required to take a good course of training in freight train work, and possibly some other, before being placed at work which brings them in contact with the public. Codes of rules now generally have a requirement that men hired or promoted must be examined and their qualifications ascertained; but every one knows that this rule is enforced with all degrees of laxity, and that it receives hardly any systematic attention on some roads. It is much to be desired that a rule of this kind be universally recognized and regularly enforced. All these points seem "too fine" for many superintendents and consequently are slighted. This being the case, it is not surprising that people ask the state to step in.

Statutes governing methods of railroad operation are not objectionable, from the standpoint of the intelligent manager who conducts those operations, provided their requirements are just and they do not hamper or prevent progress on his part. It is true that the law-makers almost always over-do the matter in trying to set the railroads right, but they may perhaps be deemed partially excusable when railroad officers make similiar blunders themselves. As long as men who act simply in furtherance of a short-

sighted aim to make money the present year own and manage railroads, just so long will law-makers endeavor to cure admitted evils by enacting new regulations. If a railroad owner in Wall street neglects to build good station houses on his road in Virginia or Missouri, the legislators of those states, in attempting to compel the erection of handsome buildings in the place of old sheds, are simply taking the most natural means, and the most direct known to them, to decide the question whether the Wall street capitalist shall be allowed to get six per cent. upon his investments, while they (the legislators) have to put up with four per cent. on theirs. And while legislation concerning safety or technical matters springs from a variety of causes, the final reason why individual legislators favor it must be found in the feeling that they are doing only what is right in compelling railroad owners to put more money into expenses and less into dividends. But so long as the requirements embodied in the legislation are just, the question of motive may be dropped so far as our present purpose is concerned. When a law is unjust or interferes with economical management the railroad manager desires to teach the uninformed farmers, lawyers and others the fallacy of their reasoning; but the only sure way to do this is to give them, with the utmost frankness, the fullest possible information concerning what *is* done with the money when they (the railroads) use it in their own way.

"Roadmaster," in discussing collisions, says nothing about the responsibility of the conductor; in fact, he says, by implication, that the engineer, in a certain case, was solely to blame. But nearly every railroad man who reads this statement can readily call to mind cases of butting collisions where the blame lay upon both the conductor and engineer. In fact this is the case in most of the collisions of that kind. The condudtor also has a share in the responsibility for rear collisions very often. The last prominent accident of this kind, that at Lorenzo, Ill., is a case in point. Though the engineer may be regarded as wholly responsible for approaching stations too rapidly, it was also true in this case that the conductor was grossly negligent in allowing too fast running, while the reckless disregard of the time-table is plainly to be laid at the door of both men.

"Men will not guard against danger when they know that no danger exists." This is the old story that if you cry "wolf" when there is no wolf, you will be left in the lurch when you really are threatened by the beast. This is a favorite theory of some, and it must be admitted that it has weight. It is certainly well that men be taught to look for danger and to act cautiously when they are likely to encounter it. On the other hand, it is an essential feature of train running that engineers, at least, be taught courage and a spirit of implicit faith in their instructions and orders. The runner of a fast passenger train on a crooked single-track road in a dark night has to *assume*, in the fullest manner possible, that there is no danger whatever in his path. One of the most patent facts of railroad experience is that in many sets of circumstances which come up every day, hundreds of times, men cannot be left to use their own judgment. They must obey implicitly what is told them without questioning the facts or authority for it. This is most noticeable where block signaling and interlocking have come into use. Although the discipline connected with the operation of these modern signals is by no means what it should be on many of the roads in this country, it is yet a fact that scores of stops are made daily in obedience to semaphore signals where the engineer can see plainly that there was no requirement of safety that made it absolutely necessary at just that moment for him to come to a dead stop. It is true that this obedience to rules regardless of one's own judgment is enforced under the circumstances mentioned only by the vigilance of watchmen and inspectors. Generally speaking, it is no doubt true that, if engineers were not liable to be reported by the man in the tower, they would sometimes run past danger signals when they felt sure that the signal was an unnecessary one. To provide inspectors to watch the behavior of trainmen out on the open road as closely as they are watched in the vicinity of important crossings and junctions, is not an easy matter; but if the strictness of discipline and the careful watching in vogue at stations and interlocking towers is right and necessary, there would seem to be no reason why it should not be regarded as necessary and right in other situations. Certainly, thousands of dollars worth of property, not to mention numerous deaths and injuries to men, result from mistakes made by conductors and engineers when they are out of sight of all inspection. The problem of detecting and correcting these lapses from duty deserves more study than it receives.

Our railroads have so long suffered from most of the special legislation that it is interesting to see some one else in the same trouble. Many of our State legislatures have just awakened to the fact that manufacturers as well as railroads indulge in pools and even in more insidious forms of combination. They are surprised at it; and their indignation is proportionate to their surprise. They knew that railroads were doing it, and had learned to expect it. They did not know that manufacturers were doing it. The difference of feeling in the two cases is well illustrated by a quarrel which two eminent English historians had concerning a third. Both agreed that he was an habitual and irreclaimable liar, but the first urged in his behalf the plea that he was a natural born liar and did so because he couldn't help it; while the other insisted, with much warmth, that he was a wicked liar, who could help it just as well as anybody else, and who did it for the pure pleasure of the thing. Now, the Western legislator is accustomed to think of a railroad official as naturally bad—bad *ex-officio*, so to speak—and doing bad things because he cannot help it. But when the manufacturer does the same thing, it shows that he is personally depraved, and his condemnation is correspondingly more severe. Men who have engaged in even the mildest form of combination had better avoid Missouri and Texas. If they sell goods there they cannot get their pay for them. If they attempt to do corporate business they will find that they have forfeited their charter; while if they have the audacity to go there in person they will find the doors of the states prison open to receive them. In fact, the Texas law is so sweeping and the moral sense of the community so aroused that that state is trying to punish those men who have made combinations in other states and are simply traveling in Texas for their health or for other innocent reasons. This spectacle of virtuous indignation is worthy of a state which has produced so bold an opponent of corporations as Judge Reagan. It is only marred by the fact that the Texas law makes an exception in behalf of cattle trusts, showing that the people of that state, like some others, much better enjoy beholding the mote—or, if you please, the beam—in their brother's eye than paying the same attention to their own.

A case under the Inter-state Commerce Law was tried by a jury recently in the United States Circuit Court, at Hannibal, Mo. The Hayward Grocer Co., doing business at Hannibal, brought suit two years ago against G. K. Tozer, the local agent of the Missouri Pacific, under those sections of the Inter-state Law forbidding discrimination and undue preference. The facts were these: There was a through rate from Chicago via the Chicago, Burlington & Quincy to Hannibal, thence via the Missouri Pacific to a small town in Kansas, of which through rate the proportion of the Missouri Pacific was 34 cents. From Hannibal proper, the local rate charged the Hayward Co. to the same place was 46 cents. Under these figures an indictment was found against the railroad agent. Last Saturday the jury brought in a verdict of acquittal on the first count (discrimination) but of guilty on the second and third counts, because the agent gave undue and unreasonable advantages to the Chicago, Burlington & Quincy road, and to the Chicago competitor of the complainant, Hayward. The penalty is a fine not to exceed $5,000, at the discretion of the court.

We hardly think the findings of a petit jury will upset the entire railroad system of the country. It will be noticed that this verdict is based upon the idea that a local rate should be no more than the proportion of a through one. Mileage pro-rata rates have been often discussed, and all railroad men are familiar with the confusion and loss of trade and traffic which would ensue upon an application of this doctrine to general transportation. Of course this case will be appealed and there is no likelihood of this mileage doctrine finding favor with the higher courts. What fine distinctions this jury drew between unjust discrimination and undue preference, so as to acquit on one and find guilty on the other, we are not informed. This case confirms the old saw that there are two things which no one can foretell one, the acts of God, and, the other, the findings of a jury.

Northwestern rates, which have been comparatively steady for several months past, have finally received a serious shock, which has come about in the old familiar manner. The Chicago, Burlington & Northern announced on May 29 that it would from June 1 reduce the rates between Chicago and St. Paul, on freight originating east of Chicago, to the basis of 34 cents per 100 lbs, first class, the old rate being 50 cents. As in the same action last year, the Burlington maintains its rate from Chicago proper at the regular figure in force on all the roads. The other lines within one or two days gave similar notices, and the reduced rates are now in effect on all of them. It is stated that the immediate reason for the action of the Burlington road was a reduction in the through rates to and from the seaboard via Milwaukee and Grand Haven, though the fact that the Northwestern roads have for two months been accepting a smaller proportion on traffic to and from the lake lines than on that received from all rail lines has caused dissatisfaction among the latter. It appears that for some reason not clearly explained the Detroit, Grand Haven & Milwaukee has announced through rates between the East and the Northwest based on the alleged fact that it is a lake line, though the water journey is only across Lake Michigan, 80 miles, and rates have always been treated as all rail, except in the case of flour eastbound, on which a small differential was allowed. The Minneapolis, St. Paul, & Sault Ste. Marie about the same time announced through all-rail rates between Minneapolis and New York on the basis of 94 cents first class, being 10 cents less than the new tariff of the Burlington. The National Dispatch Line has issued a lake and rail tariff making rates between the Atlantic seaboard and St. Paul on the basis of 79 cents first-class. It is charged that many of the numerous reductions have been put in force without giving full legal notice to the Inter-state Commerce Commission.

Uniform classification of freight as a practical thing makes very slow progress. While this progress probably will, and rightly should, continue slow, for the reason that ideal uniformity never can be attained, it is encouraging to note progress where progress is possible. There is room for much improvement, clerical and otherwise, notwithstanding the admitted difficulties in the case. The rail and steamship lines between New York and New Orleans adopt the official (Trunk Line) classification on June 10. The New Orleans traffic has always had a classification of its own, but this has lately become very irksome to some of the roads interested and a change was determined upon. As all the places in Mississippi and Louisiana, except New Orleans, already were using the classification of the Southern Association, it was thought that naturally this would be applied to New Orleans also. But as the lines in interest proposed to change the classification and not the class rates, it was seen that the Official would yield the largest revenue, because all the less-than-carload articles are, in that classification, put 4th or higher, while in the Southern many of them are 5th and 6th. So the Official was chosen in spite of the fact that New Orleans belongs to the Southern territory and might be supposed to require that tariff. A tariff of commodity rates will be issued, modifying the classification on special articles. This change may have an important effect in extending the Official Classification to other points in the South.

As a result of the accident at Borki, at which the Czar and his family "assisted," a law has been promulgated in Russia, providing for the trial and punishment of the highest officials for neglect of duty in office. It is said that the investigation of the causes of the Borki accident has shown very great negligence on the part of the then Minister of Transportation Admiral Possiet. It is rumored that the Czar desired that this Minister should not be brought to trial; but further investigation developed such monstrous irregularities in all departments of his ministry, that it seemed impossible to let him go unpunished. Consequently the Czar appointed a secret commission which reports that Possiet, as also Barons Stjernwall and Taube, should have a judicial trial. For this purpose a special court—a "Supreme Criminal Court"—is to be organized, at the head of which will be the Chief Judge of the Empire, with whom will be associated the presidents of the three departments of the Imperial Council and other chief officers of the Empire. The Minister of Justice will act as prosecutor; the defendant will choose his own advocate Whether the trial will be public or private does not appear. The provision is made not for this case only, but generally for cases of neglect of duty in the principal offices. In every case the Czar is to decide whether a trial should be had. This may be all be very well for Russia, but we would like to have the Czar tell us how the party organization is to be kept up if a man has to fritter away his time attending to "the duties of his office."

Russia is a very backward country.

NEW PUBLICATIONS.

A Treatise on Hydraulics. By Mansfield Merriman, Professor of Civil Engineering in Lehigh University. New York: John Wiley & Sons. 1889. 8vo, pp. 381.

Professor Merriman has here given us a well arranged, clearly expressed and full exposition of the principles of hydraulics. Prepared evidently for students in his classes, it is none the less valuable for engineers of long practice as a book of reference in daily work. The latest experiments and analytical investigations are drawn upon, and the sources of information are referred to specifically in foot-notes, so that the original data on which his statements are based can be consulted by those who desire to pursue any special subject more fully than it could be given in the text consistently with the scope of this work. As compared with any previous text book on hydraulics, this one appears to be very far superior in completeness, conciseness and logical arrangement.

The first chapter is devoted to definitions of the units of measurement and of the first principles of the science of hydraulics. A serious deficiency must be noted in this chapter, in the omission to give any statement at all of the relation of the metric units to the English foot and pound. This is very remarkable, because the differences between the U. S. and the Imperial gallon are given to four decimal places; but no examples of reduction for students' use are appended, while the student is asked to reduce pounds per square inch to kilograms per square centimetre, in Problem 1, without any intimation of the relation of the several units.

At the end of each of the 154 "articles" into which the subject matter of the book is divided, one or more "problems" are given. This is a capital idea, but it is not easy to understand why the solutions of some of the problems are given and of others are omitted. If this were merely a text book for the use of classes in a school, it would be proper to omit all the answers to the examples; but in a book of reference for more advanced workers it would have been better to give all the numerical answers as aids to the rapid recalling of methods of calculation in which a person may have become a little rusty. Of the first 51 problems, illustrating the first 37 articles, the solutions are given in 14 instances and omitted in 37, with no evident reason for the distinction.

To the author's recommendation in Article 7, that students should use logarithmic tables of only four figures, exception must be taken. He admits that in some hydraulic problems five-figure logarithms will be needed, but says that "probably no hydraulic data are ever sufficiently exact to require the use of a seven-figure table." While not agreeing with this broad statement, but not deeming any long discussion of it called for here, it may be said that any recommendation to to the student of the present day to use short cuts and get only roughly approximate results is unwise and greatly to be deprecated. Lack of accuracy in details is too prevalent a failing of young graduates, and ought not to be encouraged in any way. The time for a man to learn to be accurate is when he is at school, and the knowledge of how far the apparently small matters can be disregarded comes only by experience. The small additional time needed for using a seven-figure logarithmic table over a four-figure one is of little account in comparison with the habit and facility of making computations of an exactness which may perhaps not be necessary four times, but is essential the fifth time.

The danger of generalizations from insufficient data or lack of close attention to details is exemplified in the author's comments on the Kutter formula for the flow of water in channels in Article 101, page 235.

By taking a value for the co-efficient of roughness (α, as he denotes it, but n, as everybody else designates it) to three places of decimals the conclusion is reached that "errors of 5 and 10 per cent. may be regarded as common in calculations on the flow of water in conduits and canals." Now while this general statement may be true enough, it is not a fair deduction from the cases given in illustration, for reference to the data given by Hering (flow of water, etc , pp. 161 and 167) shows that the values of the co-efficients given by Merriman are not applicable to these cases. Where Merriman assumes the value $n = 0.012$, the true value is $n = 0.0126$, and cannot vary more than one unit in the fourth decimal place for quite an extended range of values of depth of channel. So, also, Merriman in the other case gives the value $n = 0.010$, while Hering's tables show that under the conditions $n = 0.0106$, with variations of not over one unit in the fourth decimal for quite a range. Merriman's statement ought to have been, therefore, that if one makes an assumption which is in error by 5 to 7 per cent. a like error will be found in the result of the computations.

The change of designation of the co-efficient in the Kutter formula, above alluded to, does not seem to be judicious. The letter n was used by the author of the formula to designate the co-efficient of roughness, and in the great mass of literature which has been written on the subject since the publication of Ganguillet and Kutter's formula in 1868, this designation has been adhered to, so that to the hydraulician n has as definite a meaning as *horse* or *pipe*. Now comes Mr. Merriman and ignores n entirely, and calls the co-efficient *alpha*. This is puzzling to all engineers who were not educated at Lehigh University, and is literally Greek to every one. There is no occasion for such revolutionary performances in scientific nomenclature, and the publisher of this book ought to have seen to it that there was a uniformity of terms in the two valuable books he issued at the same time—Hering's, in which n is the prominent feature, and Merriman's, in which α is made to stand for the same thing. In Francis' well-known formula for the flow of water over weirs, the author has taken liberties with the notation which throw all the "old fogies" into confusion, substituting b for L as denoting the length of the weir. It is very true that uniformity of nomenclature in formulæ is desirable, but old-established and well-recognized notation ought not to be changed at random. If a change is made, however, it ought to be adhered to consistently. Mr. Merriman or the proof-reader has been at fault in this respect with reference to the expression for the differential. In Articles 20 to 28 it is written with the Greek delta, δx, etc. In Articles 29 to 48 it is written in the customary way, $d x$. In Article 87 the Greek letter is again resumed and is used for the rest of the book. These are but spots on the sun, however, and attention is only called to them because so excellent a book as this ought to be perfect in every detail.

A noticeable feature in the work is the frequent reference to the investigations of American scientists in the determination of hydraulic formulæ, many of the most valuable contributions having been published in the *Transactions* of the American Society of Civil Engineers.

As a whole, this book is the most valuable addition to the literature of hydraulic science which has yet appeared in America, and we do not know of any of equal value anywhere else.

Theoretical and Practical Treatise on the Strength of Beams and Columns. By Robert H. Cousins, C.E., formerly Assistant Professor of Mathematics at the Virginia Military Institute. New York and London. E. & F. N. Spon. 1889.

This is a volume of 170 pages, with an index. On the title page it is stated that the ultimate and elastic limit strength of beams and columns is computed from the ultimate and elastic limit compressive and tensile strength of the material, by means of formulas deduced from the correct and new theory of the transverse strength of materials. We shall shortly review this work at some length, and therefore now merely make this announcement of its appearance.

TRADE CATALOGUES.

Supplementary Catalogue of the Buffalo Forge Co., Buffalo, N. Y.—This catalogue is issued as an auxiliary to the main catalogue of the company, for the purpose of explaining and illustrating the heating and ventilating apparatus which that company makes. Examples are given of the application of the system to various factories, shops, dry houses, etc. The catalogue contains illustrations of blowers and exhaust fans.

Illustrated Catalogue of the Fox Solid Pressed Steel Co., Chicago.—This company was organized, and has built works at Joliet, Ill., for the purpose of making solid, flanged forms, fashioned by hydraulic pressure, for the construction of various parts of railroad equipment and for other engineering uses. The little catalogue which is issued shows designs for trucks of various classes and for brake-beams and pedestal blocks. The trucks shown include a rigid bolster truck for a 60,000-lb. car, made up of six chief members, the side frames, end sills, transom and bolster, the centre plate being pressed in the bolster. Another one is a swing bolster truck for a 60,000-lb. car, with five principal steel members. Another form of truck of great simplicity is shown, in which the side frames, end sills, transom, centre-plate and pedestal blocks are all pressed from one single sheet of metal. The weight of this truck is about 4,900 lbs., and it is designed as well as the others for cars of 60,000-lb. capacity. Two designs of tender truck are shown, in one of which the side frames, transom and pedestals are pressed from a single sheet. It seems probable that these designs will be very extensively adopted in car building. Their great simplicity and the ease with which they can be assembled and erected must necessarily recommend them.

The Chicago & Alton Lumber-Rate Decision.

The following is an abridgment of the full decision, briefly referred to last week, of the Executive Board of the Interstate Commerce Railway Association in the matter of the request of the Chicago & Alton and the Chicago, Burlington & Quincy roads for a rate of 10 cents per 100 lbs. on lumber, Chicago to Southwestern Missouri River points, the prevailing rate being 16 cents. The decision is signed by Messrs. Aldace F. Walker and J. W. Midgley, Mr. Faithorn being away.

The Chicago & Alton's line from Chicago to Kansas City is 488 miles long. The lumber traffic between these cities has been heavy and profitable and has been an important part of the Alton's and the Burlington's traffic, but the entire traffic is now substantially at an end. The existing rate is 16 cents per 100 lbs. It is claimed that 10 cents would re-establish the movement of lumber from Chicago to Kansas City. The average distance being 500 miles this would be equal to 4 mills per ton per mile, a rate which is exceedingly low andpossibly unremunerative; but the Alton has a large number of stock cars constructed especially with a view to the economical loading of lumber westward and can therefore carry that commodity at very low rates.

The movement of lumber by all lines to Southwestern Missouri River points for the past four years is shown by the following summarized statement:

	Tons.	Revenue.	Tons.	Revenue.
	—Chicago.—		—Other points—	
1885	150,391	$499,758	392,992	$925,904
1886	187,397	594,430	374,606	1,010,945
1887	108,527	372,463	274,220	765,938
1888	55,379	124,077	113,559	194,083
Jan. 1 to March 31, 1889	4,564	13,872	19,682	51,179
Totals	515,260	$1,604,601	1,175,060	$2,948,051

The earnings of the Chicago & Alton for the same years on shipments of lumber from Chicago were as follows:

Year.	Earnings.	C. & A. per cent.
1885	$214,649	43
1886	285,452	68
1887	111,982	30
1888	31,490	25.4
Three months, to April 1, 1889	1,676	12

Statistics are given showing the tonnage per month since January, 1888, from which it appears that the movement of lumber originating at Chicago was very heavy in February and March last year, when the rate was 9 or 10 cents.

The Chicago & Alton also directs attention to the fact that, for the entire year 1888, the average rate which it received on lumber transported from Chicago to Southwestern Missouri River points was but 10.2 cents per 100 lbs.; this was by reason that a large part of its lumber traffic was from mills in Wisconsin and Michigan, the Chicago & Alton receiving a division of the through rate, which was considerably less than the local rate from Chicago to Kansas City. Under the 16-cent Chicago rate now prevailing, its division of the through rate from said territory is about 13 cents.

The Chicago & Alton insists that with a 10 cent rate the lumber dealers in Chicago would be able to regain much of the business which had been lost, and that, rather than forego the traffic, it can afford to carry lumber from Chicago to Kansas City at 10 cents per 100 lbs., or even at a lower rate.

The question is regarded by the Chicago, Burlington & Quincy Road as one between the general white pine rates and the Southern or yellow pine rates. For many years the rate from Chicago to Kansas City has been a general basis of rates on white pine to Kansas and Nebraska, which are practically treeless. The rate to Omaha is the same as to Kansas City. The average through rate from points of production (Wisconsin and Michigan) at the present time is 22 cents to the territory of distribution. The Southern roads, whose lumber traffic is not within the regulation of this association, have been able to so adjust their tariffs as to practically exclude Nortnern pine from the markets under consideration. The cost of stumpage on yellow pine is materially less than on white pine, which, in connection with differences in the price of labor, etc., has enabled its producers to lay down their product in Kansas and Nebraska at a price considerably lower than the best price which can be made on Northern pine in the same territory.

White pine can compete with yellow pine at a difference of $1 per thousand feet in favor of the latter. The present existing difference above $1 has caused the great falling off in shipments of white pine. It now finds a sale only for special uses. The Southern roads are claimed to have reduced rates on yellow pine to an abnormally low figure with a view to quickly gaining control of large markets. A recent advance from Arkansas was in connection with an advance from Chicago, and therefore made no change in the relative situation.

It must be admitted that the general consumption of lumber in the territory in question has fallen off from a number of general causes. Brick, stone and barbed wire are more generally used, and general stagnation of business has greatly checked the demand. Furthermore, shippers at Chicago and elsewhere hold back shipments in hopes of a reduction in the rate. Yellow pine has its legitimate uses. Nevertheless, the great development of the yellow pine industry has resulted chiefly from the low prices at which it has been sold in the markets under consideration. Tables of comparative rates are given showing, for instance, on white pine from St. Paul to Kansas City, 565 miles, 18 cents; on yellow pine from Little Rock to Kansas City, 590 miles, 22 cents; from Mountain Grove, Mo., to Kansas City, 270 miles, yellow pine, 13 cents. The Missouri, Kansas & Texas brings lumber across the Indian Territory to Kansas City. The Southern lines set forth the fact that yellow pine weighs from 2,000 to 3,000 lbs. per thousand feet more than white pine, so that the freight rate per thousand feet is proportionately higher from Southern points.

Nearly every other line in the association objects to the proposal of the Alton and the Burlington. The Missouri Pacific objects because it carries much yellow pine to the territory in question. That road threatens corresponding reductions in yellow pine, and retaliative cuts upon other commodities. "It is not, however, regarded as possible that the intelligent managers of the Southern roads will entertain a suggestion so contrary to just ideas of management. * * No common carrier can be justified in engaging in a general rate war to punish an adversary or to redress a wrong. In so doing it not only sacrifices the immediate income of its own stockholders and the interests of all for whom its administration is directly conducted, but also inflicts great injury upon the public at large, which finds its business plans and enterprises thrown into confusion, the prices of commodities unsettled, and eventually, in one way or another, is called upon to pay the bill. The employment of retaliatory methods is no longer admissible. The country is aroused to the wrongs that they involve both to railway owners and to shippers. If the former cannot stop them, it is obvious that the state must interfere."

Nevertheless, rates must be reduced to meet competition. But where will be the advantage? First one side would reduce and then the other, and neither would gain. But the Northern roads regard the Southern roads as aggressors, and there are good reasons to support this theory. The Southern managers, being amenable to reason and arguments, will doubtless recognize this. Existing facts show that a difference in the rate of even 6 cents more than at present would not exclude Southern pine from the desired market. The Chicago & Alton has moved with deliberation and great patience and deserves liberal and courteous treatment.

The Wabash Western objects to the new rate because it has considerable westbound lumber traffic from St. Louis, the rate on which would have to be reduced. It believes 4 mills per ton per mile unreasonably low per se. The Atchison, Topeka & Sante Fe is on both sides of the question, and believes that if any change is to be made Southern rates should be advanced. Unfortunately, however, these are not subject to just arbitration. The Rock Island and other more northerly lines are dissatisfied with the present situation, but still oppose the reduction. It would reduce the rate on lumber to Omaha and to points west and northwest thereof and thus seriously affect the revenue of these lines. The Burlington, Cedar Rapids & Northern fears the effect on Iowa rates. The authorities of that state would seize the occasion to compel equally low rates on all traffic.

Our conclusion, therefore, is as follows: We do not feel justified in authorizing the Chicago & Alton and Chicago, Burlington & Quincy companies to make the proposed reduction to 10 cents per 100 lbs. Such a step would greatly disturb the lumber rates of all the lines, and would almost inevitably result in great loss, even to some which are not involved directly in the controversy. It would probably be met by a reduction on the part of the Southern lines which could not be confidently affirmed to be altogether unjust. It would, no doubt, for a time afford increased tonnage to the roads which are seeking it, but tonnage without profit is of no value, except for advertising and statistical purposes, and to inflict direct losses upon the income of associated lines for the purpose merely of making an exhibit of enlarged tonnage, when no net revenue above expenses is in sight would be consistent neither with the principles of this association nor with ordinary consideration for the rights of others. When business conditions have become so changed that traffic can not be handled save at a non-remunerative rate, the abandonment of the traffic should be seriously considered. To insist upon taking it without profit merely for the sake of maintaining its possession, is hardly business-like, nor is it justice to competitors. The proposed 10-cent rate would practically be a war rate, and only justifiable as such. It is the part of wisdom to count the cost before taking the sword. A conflict is proposed which may entail losses upon the various contestants amounting to millions of dollars, and which, after all, can only be settled upon some such plan as that which is above referred to. The Executive Board regards the proposed 10-cent rate as one which is not justified by existing circumstances; which would be of no practical or substantial advantage to the roads which ask it; which would invite immediate reductions by the Southern roads, and thus would neutralize itself; and which would work great injury to other lines in this association. The finding, therefore, is that the rate cannot properly be authorized.

At the same time, as has been already suggested, we think that the Alton and Burlington lines are justified in making reasonable efforts to correct the present commercial injustice and that their patrons have claims which should not be altogether ignored. We believe the best way for all concerned to be the adoption of some general arrangement such as has been proposed, designed to put an end to unjust discrimination between the shippers of different sections, and to establish a just, reasonable and permanent system of rates, in which the tariff from all points to all points shall be constructed upon sound commercial principles; and, if all efforts to agree shall fail, we believe that a reduction might be made in the rates from Chicago to Kansas City, which would not be unjust to the Southern lines and which would not necessarily injure the other Northern lines; a reduction which would enable Northern manufacturers to enter again to some extent their lost market, and at the same time would leave Southern manufacturers in the possession of all their rights. This belief is in part the result of our observation of certain facts which have not as yet been stated.

There was a considerable time during the latter part of 1888 when the rate from Chicago to Kansas City was 13½ cents, while the rate to Omaha was maintained at 16 cents. There is no reason apparent why this may not be repeated. The distance to Kansas City by the shortest line is only 457 miles, as against 490 to Omaha. The commercial necessities of the situation may entitle the Kansas City lines to make some reduction upon Northern lumber, for the purpose of attempting to restore its use and to reinstate the traffic. A reduction of 3 cents should not be complained of by the Southern lines, nor should it be met by them. It would mean a reduction in the price of lumber at Kansas City of from 60 to 70 cents per thousand feet. Under the existing disparity in price, the Southern roads would have no apparent occasion to meet it, yet it would, no doubt, somewhat assist the efforts of Northern manufacturers to reintroduce their product, and, to some extent, enlarge the scope of its use. It would not be open to the objection that it was a war rate; it would not be non-remunerative. It might not produce so large results in tonnage as would follow from a 6 cent reduction unmet, but it would probably produce greater results in net revenue, and if put in without corresponding reductions by the Southern roads, it would be

much more useful, both to the carriers and to the lumbermen than would be a 6 cent reduction followed by a corresponding cut in the competitive product. It would not necessarily involve such reductions in the rates from St. Louis, Muscatine and other Mississippi River points as would follow from a sudden 6 cent drop in the Chicago rate; those rates could be so adjusted as to preserve the differential principle, without employing the whole permitted differential. It may be said that if the Kansas City rates are so adjusted as to entitle the carriers of Northern pine to reduce them, the same must be true of the Omaha and Lincoln rates, where the haul of Southern pine is much longer and the rates are identically the same. This is so. The roads that supply Nebraska from the North and East would probably be justified in making a cautious reduction in their lumber rates, provided they had only the Southern competition to consider. But they are not at present asking to do so, nor do they regard it as expedient for them to do so in view of other considerations. The problem, therefore, is to protect their standing, while allowing the Kansas City lines in this association to meet the Southern lines at Southwestern Missouri river points upon a more equal footing.

We think that this might be done by establishing a rate of 13 cents, Chicago to Kansas City, Leavenworth, Atchison and St. Joseph, leaving the Northern lines open to apply to it the differentials appropriate to their traffic so far, and so far only, as they consider necessary; but we think that this step should not be taken too hastily, for a mutual arrangement of the matter is far better for all concerned.

If such a reduction should eventually be thought expedient as a last resort, it should of course be limited to such lumber as is strictly competitive with the Southern product, not including hard-wood lumber, fence posts, cedar posts for paving purposes, and other similar articles.

As the subject is now presented, however, this arbitration can only pass upon the question of the authorization of the particular rate proposed.

TECHNICAL.

Locomotive Building.

The Rhode Island Locomotive Works have nearly completed an engine of special type for the Chicago, Milwaukee & St. Paul, and locomotives are being built for the New York & New England, Chicago, Burlington & Quincy, Savannah, Americus & Montgomery and Kansas City, Wyandotte & Northwestern roads.

The Atlantic City road has recently received four new, locomotievs with Wootten fire-boxes 18½×22-in. cylinders, 68-in. driving wheels, from the Baldwin Locomotive Works and they are now in service. Three additional locomotives with Wootten fire boxes were received June 4, a part of an order of six with 21×22-in. cylinders and 68-in. wheels; the balance of the order will be delivered next week, making 10 new engines available for this year's business.

The Texas & Pacific have received the first lot of locomotives of an order for 25 recently placed.

Car Notes.

The Louisville, New Albany & Chicago road is building 100 refrigerator cars, the first the company has ever owned.

One of the oil companies which has just opened a well at Terre Haute, Ind., has contracted with the Terre Haute Car & Mfg. Co., to build 20 oil-tank cars for them.

The Baltimore & Ohio has received at Chicago four new Pullman sleeping cars.

The Ohio Falls Car Co., has contracted to build for the Cincinnati, New Orleans & Texas Pacific four passenger, four baggage, one postal and three private cars.

The Pullman Company is building for the Atlantic City road 45 first-class coaches and five combination cars, the first instalment of which will reach Camden June 10. All will be delivered by June 28.

The Centropolis Car Co., of Centropolis, Kan., will increase its capital stock from $120,000 to $250,000. The company will begin building cars in about 30 days. The foundry department has been running some time, and is now working on castings for the Denver City cable cars. The company has been permanently organized by the election of S. J. Shoop as President and General Manager, and J. J. Baughman as Secretary and Treasurer.

The South Baltimore Car Works are completing at the rate of eight a day the 700 cars recently ordered by the Richmond & Danville for the southern fast freight business. The works are also working on an order for 50 freight cars for the West Virginia Central road, and there is work enough on hand to keep the company busy till September. New machinery has been recently put in and a new foundry built.

The Wason Manufacturing Co., of Brightwood, Mass., has just completed 10 passenger cars for the Provincial Railway, of Buenos Ayres, S. A. The cars are of two different types of finish, five being finished in oak, having high-backed stationary seats, and five in cherry with reversible seats. Each is 52 ft. long and 9 ft. 10 in. wide, and is equipped with English couplings. The exteriors are paneled and painted the Pennsylvania color, handsomely decorated. Each coach is divided in the middle by a partition, as the senores must occupy one portion and the senoras the other. The company is finishing five combination smoking and baggage cars for the Flint & Pere Marquette road, which will be delivered about July 1.

Bridge Notes.

The Wrought Iron Bridge Co., of Canton, Ohio, has been awarded the contract for building an iron bridge at Asheville, N. C., to cost $14,000, and to have one span 253 ft. long, with approaches on each side 100×25 ft. long.

The new iron bridge over the Potomac River at Point of Rocks, Md., is about completed, and will be formally opened within the next ten days.

The city of Brattleboro, Vt., has just completed a fine new suspension bridge across the Connecticut River, with a span of 300 ft. The whole bridge, including sub-structure and superstructure, was furnished by the Berlin Iron Bridge Co., of East Berlin, Conn. The same company is also building a suspension bridge with a span of 200 ft. at Milford, N. H

The Edge Moor Iron Co. has just completed a viaduct for the East Tennessee, Virginia & Georgia, on the Georgia Division, near Jackson, Tenn.

The Shiffler Bridge Co. has completed a viaduct at South River, Tenn.

The Louisville Bridge Co. has completed a viaduct 30 miles south of Atlanta. It is 600 ft. long and 60 ft. high.

The Detroit Bridge Co. has just finished a two-span bridge at Paint Rock, on the Memphis & Charleston road, and has also completed some 70 girders at the same place.

The Penn Bridge Co., of Pittsburgh, has the contract for building a bridge near Akron, O., for the Cleveland, Akron & Columbus road, for $1,625.

The King Iron Bridge & Mfg. Co., of Cleveland, O., has secured the contract for 11 spans of iron bridges for the Richmond & Danville.

The Duluth Iron & Steel Co., of Duluth, Minn., has contracted with the Berlin Iron Bridge Co. for an elevated railroad to be used in conveying ore to the top of its new blast furnace. The road will be made of plate girders supported on iron columns and is made entirely of iron.

The Mayor of Baltimore has signed a bill appropriating $80,000 to rebuild the Light street bridge with a new iron draw.

The New Jersey Steel & Iron Works, of Trenton, N. J., has received the contract for building a one span wrought-iron bridge at Highstone, N. J. The contract price is $1,493. There were eight bidders for the work.

The contract will soon be let for an iron through truss bridge over Stones River on the Lebanon branch of the Louisville & Nashville.

Manufacturing and Business.

The Egan Co., of Cincinnati, O., has just brought out a new three-drum sand-papering machine.

The Thomson-Houston Company has recently closed new contracts to construct 19 cars for 21½ miles of new railroad.

The New England business of the Sprague Electric Railway & Motor Co., of New York, will hereafter be conducted by the New England Electric Co., with offices at 55 Oliver street, Boston.

The Bucyrus Foundry & Manufacturing Co. has removed its Chicago office from 115 Dearborn street to Room 656, "The Rookery." This office is under the management of Mr. E. W. Cramer, who represents both this company and the Bucyrus Steam Shovel & Dredge Co., in Chicago and vicinity.

The Washburn Car Wheel Co. has just received an order for 400 36-in. steel car wheels from the New York Central & Hudson River road, and has work on hand sufficient to run the shop to its fullest capacity for six months to come.

The Thomson-Houston Electric Co. reports sales of stationary motors, aggregating 20 horse-power. The company also reports sales in different parts of the country of 10,750 incandescent and 1,300 arc lights.

The Laidlaw & Dunn Co. has received the contract for the pumping outfit for the United States barracks at Newport, Ky. This outfit is located at the new reservoirs of the Covington Water-Works. This company reports a large business in its standard "duplex" pumps.

The Keystone freight car seal is now in use on 15 different roads in the United States, and also on some in Mexico and Central America. Although introduced less than a year ago it has met with gratifying favor among those who have carefully examined its merits. It has been adopted by many factories and other large concerns which ship freight by the carload and do their own sealing. Among these are 10 large breweries, 3 refrigerator lines, 3 cotton-seed oil works, 20 packing houses, tanneries, etc.

Eynon & Ingersoll, Cleveland, O., report among their recent sales a 22 × 22 × 33 milling machine to the Pencoyd Iron Works, Pencoyd, Pa.; a 22 × 22 × 5 milling machine, and a 10 × 10 × 4 miller to the Erie City Iron Works, Erie, Pa.; 15-in. shapers to the Cookson Iron Works, Kansas City, Mo.; Yerkes & Finan, St. Louis; Geo. J. Fritz, St. Louis; Keystone Iron Works, Kansas City, Mo.; and the Alabama Iron Works, Birmingham, Ala.; and a 22 × 22 × 5 miller to the Lorain Wrench Co., Lorain, O.

The Norfolk & Western has just erected an electric plant at Bluefield, W. Va., for lighting the yard at that point. There are 21 lights in operation. The dynamo is located in the machine shops and is run by the same engine that runs the machinery in the shop. The cost of 21 lights will be about 15½ cents per light per night. They have also erected an automatic electric block signal at Elkhorn tunnel, for the purpose of blocking trains while passing through the tunnel, which is about one-half mile long and on a very heavy grade.

Iron and Steel.

William Swindell & Bros., of Pittsburgh, have recently received a contract to construct three tube welding furnaces for J. C. Hodgson, of Montreal, Canada The new plant will have a capacity of from 25 to 30 tons per day.

The plant of the Oil City Tube Co., at Oil City, Pa., which has been running single turn for some time, has been put on double turn.

The puddling department of the Terra Haute Iron & Nail Works, at Terre Haute, Ind., has been in operation only two weeks since April, 1888. The nail-plate department resumed operations a few weeks ago.

Sharon Furnace, at Sharon, Pa., operated by Spearman, Collord & Co., has been blown out. It has been turning out about 75 tons of metal per day. The lease expires in July next, and it is thought that it will not be renewed. The furnace is owned by Boyce, Rawle & Co., of Sharon, Pa.

The Ellis & Lessig Steel & Iron Co., of Pottstown, Pa., has announced the closing of its nail works. The company has over 100 machines.

The Rail Market.

Steel Rails.—In the east orders for 25,000 tons have been placed and several sales are pending; but at Chicago only small orders have been received. It is said that the sales for May at this place will not reach 15,000 tons. In the east $27 at mill is quoted, and at Chicago $29@$30 is asked.

Old Rails.—Several inquiries are reported in the eastern markets, but no sales have been made, as holders will not accept $22, which is bid. In Chicago several lots aggregating from 500 to 1,000 tons have been sold at a price equal to $19.50@$20.

Celluloid.

According to a recent French patent the inflammability of celluloid, of which every one has seen striking examples, can be much reduced or overcome altogether by adding chloride of zinc to the celluloid mixture in the process of manufacture.

Standard Wheel Tread and Flange.

Messrs. Thomas Prosser & Sons, the American agents of Krupp, have issued a circular announcing that in future, unless otherwise requested, they will furnish all locomotive driving tires, leading truck wheels, tender wheels and car wheels with the section of flange and tread which has been adopted by the Master Car Builders and the Master Mechanics as standard. They have been obliged to keep on file between 75 and 100 different sections of flange and tread, but report that their customers have almost without exception adopted the standards of the Associations.

The Teal Portable Hoist.

The special committee of the Franklin Institute to which was referred the Teal portable hoist has made a report, giving the results of examination and tests of this apparatus, and recommending it for the John Scott legacy premium and medal. The hoist consists of a frame and swivel hook, made much in the usual form of such hoists, which supports a novel form of differential hoisting mechanism. There are two sprocket wheels on separate shafts on opposite sides of a pinion. Each sprocket wheel is connected with the pinion by a spur gear, so that the pinion as it revolves turns the sprocket wheel also. Although these wheels are of the same size, they are geared for different speeds. The lift chain is carried up by one wheel and down by the other at different velocities, and the hoisting hook is carried in a bight of the chain. This hoist has also a slow and powerful motion for lifting a load by means of a hand chain and a quick motion for overhauling the chain, and lowering the hook by pulling directly upon the lift chain. The journals of this hoist are self oiling, having a chamber filled with fibrous packing in each journal.

The committee says, "Supposing the convenient velocity in pulling the two chains to be the same; then in the 1,000 lb. hoist examined by us, the hook can be overhauled five times faster by a pull upon one side of the lift chain, or $\frac{6}{7}$ times faster by pulling on the other side, than it can be by the hand chain. This increases the capacity and usefulness of the hoist and it is, therefore, a valuable improvement. The extent of this improvement can be seen more fully, perhaps in the table annexed, which gives the velocity ratio and overhauling speed of several well-known hoists with the ratio of increase in the Teal hoist:

	Capacity.	Hand chain to hook. Vel. Ratio.	Overhaul.	Increase speed.
Weston.....	1,000 lbs	23 to 1	23 to 1	None
Barrington...	1,000 lbs	60 to 1	60 to 1	None
Box.....	1,000 lbs	36 to 1	36 to 1	None
Wharton.....	1,000 lbs	36 to 1	36 to 1	None
Teal.....	1,000 lbs	38.5 to 1	7.62 to 1	5 times
Teal.....	.....	.....	5.74 to 1	6.7 times

The Brotherhoods on Automatic Couplers and Brakes.

A convention was recently held at Bloomington, Ill., of the Brotherhoods of brakemen, firemen, switchmen and conductors. Among others who were present and addressed the meeting was Mr. L. S. Coffin, who spoke with great effect on the subject of the use of automatic couplers and brakes. The various bodies, in a union meeting, adopted resolutions petitioning the Inter state Commerce Commission to take up the matter of danger to train and yardmen from the continued use of the old methods of coupling and braking freight trains, and to recommend to Congress legislation requiring all cars entering into inter-state commerce to be equipped with some uniform automatic coupler and brake as speedily as possible.

The Parsons Automatic Block.

The "Parsons Block, Switch and Frog System," a model of which was exhibited for some time in New York city, has been put down on a short piece of track of the Chicago, Rock Island & Pacific, near Joliet. A public trial of the apparatus will be made Monday, June 10, and officers of various railroad companies are invited to be present. The system is designed to afford an automatic block system, and is provided with a continuous rail frog, together with provision for signaling trains on crossing tracks. The apparatus, as erected on the Chicago, Rock Island & Pacific, has been constructed by the Illinois Steel Co., formerly the Joliet Steel Co.

The New Orleans Bridge.

A commission of United States engineers, with Gen. C. B. Comstock at the head, met in New Orleans, May 27, to hear arguments for and against the proposed bridge across the Mississippi at New Orleans. Representatives of the river steamboat trade protested against building a bridge above the city. They said that if it were built above the city it should have a channel span of not less than 1,000 ft. in the clear and be not less than 95 ft. above high water, and so located as to give sufficient room for a tow to be straightened above for the passage through. Others suggested that the minimum clearance above high water should be not less than 119 ft. The representatives of the Morgan line of steamships thought that a bridge below the city would be a serious obstruction, and that if it were so placed it should be at least 140 ft. high. The commission adjourned to meet in New York, June 20.

Creosoting.

It is said that the Carolina Oil & Creosote Co., of Wilmington, N. C., has closed a large contract for creosoting timber and piling for the Nicaragua Canal Co., work on which is to be begun at once.

New Rail Section of the B., R. & P.

The Buffalo, Rochester & Pittsburgh has adopted a new rail section of 70 lbs. The new rail is 4⅜ in. high, and the base is the same dimension. The upper corner of the head is $\frac{5}{16}$ radius and the crown 12 in. radius. The greatest width of head is $2\frac{29}{64}$ in. The inclination of the side is 4 deg. from the vertical, and the fishing angle 13 deg.

Annual Inspection on the Roads of the Plant System.

The report of the fifth annual inspection of the roadway of the Savannah, Florida & Western, Charleston & Savannah and Brunswick & Western roads has just been issued. The inspection was made in the middle of December last. As is well known, these companies have one of the most careful systems for conducting this work and have given the matter special attention for several years. The first premium for division roadmasters is $100 and the second $50. For section foremen the first premium is $40 and the second $20. The total amount of premiums this year is $720, including nine premiums of $10 each to the wives of section masters who rank highest in the neatness of section houses and grounds. Two section masters had been on their sections less than six months, and so received no premiums, though meriting them by their marking. A summary is given of the total averages of the annual inspections for each year since 1884, which shows an almost constant improvement, the averages for the Charleston & Savannah being 1884, 7.740; 1885, 7.850; 1886, 7.510; 1887, 7.610; 1888, 8.420; and the Savannah, Florida & Western 1884, 7.950; 1885, 7.601; 1886, 8.083; 1887, 7.956; 1888, 8.640. These are the results of markings for each single mile of road in the six different departments of line, surface, level, frogs and switches, drainage and policing. Perfect track is marked 10. The average of the Brunswick & Western is 7.06. This road was not included until 1888.

A German Corrugated Furnace Locomotive.

Glaser's Annalen, of recent date, contains an interesting illustrated description of a locomotive with a corrugated fire-box. The engine was built at the Central Locomotive Works at Dortmund, Germany, or, more properly speaking, it was rebuilt there since only the boiler is new. The forward part of the boiler with the tubes is similar in all respects to the ordinary form, while the rear portion is fitted with a 4-ft. corrugated flue, serving at once as a furnace and a combustion chamber, though the arrangement is such

that the latter is of comparatively limited extent. The engine has been in regular use since June, 1888, and has been found to perform in a very satisfactory manner.

Leslie's Rotary Snow Plow Abroad.

That the Leslie snow plow or shovel, which within the past year or two has come into such prominence here, is also attracting attention abroad is shown by an extensive article with illustrations relating to it, published in a recent issue of *Glaser's Annalen für Gewerbe und Bauwesen*. The illustrations used are those published in *The Railroad Gazette*, and the article itself is mainly compiled from different American sources. The history of the introduction of the plow into use in the United States is reviewed, and records of its work are given and compared with the work capable of being done by the hitherto customary methods of removing heavy snow obstructions from railroad tracks. Altogether German opinion seems to be decidedly in favor of the Leslie plow, and it seems not unlikely that its principle at least will be made use of on German roads at no distant date.

The Westinghouse Engines.

The Westinghouse Machine Co. is fitting up a new machine shop, for large work, on the east side of Twenty-fifth street and Liberty avenue, Pittsburgh. A very large new planer, by William Sellers & Co., is already erected and in operation, and a large new cylinder boring machine, of special design, by the Pond Machine Tool Co., is now in process of construction.

Among the orders for the new automatic compound engine received by the company for the first three weeks in May, the following prominent buyers are mentioned:

Baldwin Locomotive Works, Philadelphia, Pa., one 200 H. P.; Southern Cotton Oil Co., Memphis, Tenn., one 250 H. P.; Southern Cotton Oil Co., Memphis, Tenn., one 200 H. P.; Omaha and Council Bluffs Railway & Bridge Co., Omaha, Neb., three 200 H. P.; L. Delannoy, Barcelona, Spain (for Clariana, Ciuro, Pubeonat & Co.), one 35 H. P.; Electric Improvement Co., San Francisco, Cal., one 80 H. P. and one 35 H. P.; Penna. Institute for Feeble-Minded Children, Elwyn, Pa., one 50 H. P. and one 35 H. P.

The Vestibule in Court Again.

The Pullman Palace Car Company is complainant in another suit in the Federal Court against the Wagner Palace Car Company and the Lake Shore & Michigan Southern Railway Company to restrain infringements of a patent to George M. Pullman, May 14 last, for vestibule connections between railroad cars. In the suit recently decided between the two sleeping-car companies, only the face plates used as buffers to prevent oscillation were involved. The present suit involves the vestibule as a complete structure, and though only patented May 14, it is said to have been for two years before the patent examiners before it was issued, though it was in actual use on a vestibule train in May, 1887. It is admitted that a road in Connecticut had a vestibule train 30 or 40 years ago, but it is claimed that the effort to run it was a complete failure.

Syracuse Water-works.

A special election held at Syracuse June 4, to decide whether the city should build and own its own water-works, and bonds should be issued to the amount of $3,000,000 or less, resulted as follows:

For municipal ownership and bonding, 11,302; against, 910. This is the outcome of a spirited canvas made by Mayor Kirk and his supporters, as against the Syracuse Water Company, which has controlled the water supply of the city since 1827; and also against three or four rival corporations which have been seeking to obtain a franchise for furnishing water to the city.

The water for the city is to be taken from Skaneateles Lake in accordance with the plans recommended by Mr. J. J. R. Croes, Engineer to the commission appointed by Mayor Kirk in July last.

A New Sound Steamer.

The trial trip of the new side wheel Providence line steamer "Connecticut" which was recently launched, took place this week on the Hudson River. The steamer developed a horse-power of 6,000, the paddles making 30 revolutions a minute. The "Connecticut" is 357 ft. long over all, 345 ft. on the load line, 48 ft. beam outside the hull planking and 87 ft. extreme width over the guards. Her depth of hull is 17 ft. 3 in., extreme depth forward 26 ft., aft 20 ft. From the top of her pilot house to her keel is 60 ft. She is painted white. Her machinery, including the water in the boilers, weighs about 1,000 tons. Her machinery is duplicated in nearly every detail and every set of engines work independently of the others. Her interior is fitted up in the most luxurious fashion. Her grand saloon is in a semi-circle, is 280 ft. long, and is surmounted by a beautiful dome 240 ft. long. Electricity furnishes the light.

Polishing Belts.

The convenience afforded by flexible polishing and grinding apparatus is readily apparent and lends some interest to a note in an Austrian journal, describing a means of preparing bands or belts, so as to be available for grinding and polishing surfaces of objects of various cross-sections. Polishing belts in general are scarcely novelties, and have been used in the past with some success, the ease with which they may be brought in contact with nearly all parts of complex surfaces or bodies by simply wrapping them around the latter, having done much to recommend them. It was found, however, that when the abrading coating of the belts became worn off in spots, and this occurred very easily, the exposed natural surfaces were rapidly destroyed and with them the body of the belts. To overcome this the following process has been proposed: Ordinarily spun threads of cotton, linen, hemp or other fibre are to be drawn through a warm solution of glue and then through the finely pulverized polishing powder, after which they are to be dried and wound on spindles. In order to insure greater elasticity, a small percentage of glycerine is added to the glue solution. The threads so prepared are then woven, in the ordinary way, into bands of desired width which may be made to form coverings for bands woven from unprepared threads. The latter, cores, if we may so call them, are coated with glue or some other other similar material, so as to produce their firm adherence to the outer covering. By this arrangement, should any of the prepared threads be destroyed the remaining portions cannot become unravelled and produce a serious local defect. In order to insure greater durability of the finished product the belts, after having been dried, are steamed for a short time.

Electric Lighting at the Paris Exposition.

Bearing upon the arrangements for electric lighting of the several departments at the recently opened Paris Exposition, it is of interest to note some particulars given in the *Revue Industrielle*. From a somewhat extended account there given, it appears that there will be 6,437 arc and incandescent lamps distributed over five sections.

To apply power for these there are or will be six central stations. The first of these, the Gramme station, covers 640 square meters of space and embraces 5 dynamos calling for 275 horse power, and working with a difference of potential of 200 volts. Steam is furnished by 9 boilers of the locomotive type fitted with mechanical stokers. The engines were built by the English firm of Davey Paxman and are of the triple expansion design. There are three altogether, one of them being rated at 350 horse power; the second at 250, and the third at 100 horse power, the total available power at this station thus amounting to 700 horse power.

The Edison station occupies also a space of 400 square meters. It has 4 Belleville boilers of 150 horse-power each and 4 engines built by Weyher & Richemond, also rated at 150 horse-power each. Eight Edison dynamos supply the electric current. The Jeblochkoff station occupies the same space as the two previous installations, and comprises 4 boilers capable of furnishing 600 horse-power altogether. There are four 150 horse-power engines built by the firm of Leconteux & Garnier. Nineteen dynamos supply the current. Among them are eight alternating Gramme machines, 10 continuous current Rechniewski dynamos and one alternating Farnard dynamo.

The Marcel-Deprez station has two Corliss engines coupled together and capable of developing 500 horse-power. Steam is furnished by tubular boilers. Four dynamos designed by M. Deprez are there used, the current being used for power transmission. The fifth, or Ducommun station has 300 horse-power boilers of the Lagosse type and the engines, built by Messrs. Ducommun, are of the Armington & Sims high speed pattern. There are at this station 15 dynamos. The sixth station, finally, is fitted up with 400 horse-power, the boilers supplying part of their steam to the English machinery section. There are here four dynamos and three engines of different makes, developing 170 horse-power. In addition to these there is at this station a portable Parsons steam turbine.

Besides the six stations here briefly referred to, averaging something over 3,000 horse power, there is available still another set of engines located in the machinery hall. This comprises a number of gas engines, exhibited by the Compagnie Parisienne, developing 150 horse-power; a set of Otto gas engines rated at 250 horse-power; a 20 horse-power compressed air engine, and five steam engines ranging from 30 to 100 horse-power, and developing together 380 horse-power. The total available power accordingly figured up to nearly 4,000 horse-power. As a further aid in carrying out the electric illumination there will be a set of electric accumulators whose combined weight will be 11 tons.

Electric Tramways in Factories.

A need of better facilities for the handling of supplies and products in large manufacturing establishments has led to the adoption of tramway cars propelled by electric motors. Many large mills now being supplied with electric lighting systems renders this an easy matter, and the electric tramway may soon be considered a necessary feature in mill equipment. The Thomson-Houston Electric Co. has already equipped several tramways, and has contracted for others which will soon be put in operation. The tramway car at the company's works in Lynn, Mass., is used for carrying heavy machinery to different parts of the factory, and its use permits the handling of material with greater ease, in less time and with less labor than could be accomplished by other methods. The car is equipped with two 3 H. P. motors, and easily carries up a grade of 13 ft. a load of five tons, while from 8 to 10 tons can be carried on a level. The motors receive their current through an overhead wire from one of the generators in the factory.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Albany & Susquehanna, $3.50 per share, payable July 1.
Philadelphia, Wilmington & Baltimore, 3 per cent., payable July 1.
Rensselaer & Saratoga, $4 per share, payable July 1.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago, Kansas & Nebraska, annual meeting, Topeka, Kan., June 12.
Chicago, St. Paul, Minneapolis & Omaha, annual meeting, Hudson, Wis., June 8.
Oregon Railway & Navigation Co., annual meeting, Portland, Or., June 18.
Roanoke & Southern, annual meeting, Roanoke, Va., June 18.
St. Paul & Duluth, annual meeting, St. Paul, June 17.
Toledo, St. Louis & Kansas City, annual meeting, Toledo, Ohio, June 12.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Train Dispatchers' Association* will hold its second annual convention in Indianapolis, Ind., June 12. E. J. Peabody, 237 Franklin street, Chicago, is Secretary.

The National Association of General Baggage Agents will hold its next meeting at Detroit, Mich., July 17.

The *American Railway Master Mechanics' Association* will hold its next annual convention at Niagara Falls, beginning Tuesday, June 18, with headquarters at the International Hotel. All who wish to secure rooms should apply to Mr. A. H. Gluck, Manager, International Hotel, Niagara Falls, N. Y.

The *Master Car-Builders' Association* will hold its next annual convention at Saratoga Springs, N. Y., June 25. Hotel accommodations may be secured by applying to H. S. Clement, Manager Congress Hall.

The Association of American Railway Accounting Officers will hold its next meeting at Niagara Falls, N. Y., July 10.

The International Association of Car Accountants will hold its fourteenth annual meeting at Plank's Grand Hotel, Island of Mackinaw, Mich., June 25.

The Traveling Passenger Agents' Association will hold its next meeting in Plank's Hotel, Mackinac Island, Mich., July 9.

The Roadmasters' Association of America will hold its seventh annual convention at Denver, Colo., Sept. 10.

The New England Roadmasters' Association will hold its next meeting in Boston, August 21.

The American Association of General Passenger and Ticket Agents will hold its next semi-annual meeting in Atlanta, Ga., Sept. 17.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month, except June, July and August. The next meeting will be held Sept. 11.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The Central Railway Club meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p.m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p m., on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

American Society of Civil Engineers.

The annual convention of 1889 will be held at Seabright, N. J., beginning June 20. The convention will be held at the Octagon House, where arrangemants have been made for the accommodation of members and guests at the rate of $3 per day. The location is a very convenient one, as boats for Seabright leave New York three times a day, the round trip fare being $1.35. Arrangements have been made for yachting parties and drives. The Trunk Line Association, the Central Traffic Association and the Southern Passenger Association will give tickets to and from the convention at the usual convention rate of one fare and one-third, on the certificate plan. These tickets are to be purchased to New York and not to Seabright.

Among the new papers that are to be presented are the following:

American Railroad Bridges, Theodore Cooper; The Sibley Bridge, O. Chanute, W. H. Breithaupt and John F. Wallace; Timber Trestle Bridges for Railways, Onward Bates; Componential Trusses for Traveling Crane, Henry B. Seaman; The Improvement of Railway and Street Railway Track, E. E. Russell Tratman; Metal Track for Railways, E. E. Russell Tratman; Wheels and Rails, G. Leverich; Development of the American Rail and Track, J. E. Watkins; The Settling and Filtration Basins of the Vicksburg Water-Works, Clarence Delafield; Some Maximum Rainfalls in Boston, Desmond FitzGerald; Ship Canals, R. E. Peary.

A report will be presented from the Committee to consider the proper relations to each other of the sections of railway wheels and rails and the subject will be discussed.

It is desirable that papers offered for presentation at the convention be sent to the Secretary not later than June 15, so that proper attention may be given the subjects presented.

At the meeting of June 5 the following members were elected: Martin Gay (elected junior, June 4, 1884), West New Brighton, N. Y.; Julien Astin Hall, First Assistant Engineer Richmond & Danville Railroad, Washington, D. C.; Frank Nearing, Chief Engineer for Brown, Howard & Co., New Croton Aqueduct, Tarrytown, N. Y; George Spencer Pierson, Kalamazoo, Mich.; Arthur Burr Starr, Superintendent Eastern Division Pennsylvania Co., Allegheny, Pa. *Associates.*—Jules Breuchaud, New York City; Kiosaburo Fuiami, Kansas City, Mo.; John Vose Hazen, Professor of Applied Mathematics and Civil Engineering, Hanover, N. H.; Millard Hunsiker, Carbon Iron Co. Pittsburgh, Pa.; Frank Clifford Lewis, Engineer the Mount Vernon Bridge Co., Mount Vernon, O. *Juniors.*—William Channing Cushing, Engineer Maintenance of Way, Cincinnati & Muskingum Valley Railroad, Zanesville, O.; Thomas Francis Lawlor, Resident Engineer in charge construction eastern and western approach to Poughkeepsie Bridge, Poughkeepsie, N. Y.; Merritt Haviland Smith, Assistant Engineer Croton Aqueduct, Department of Public Works, New York City.

A discussion took place on the cause of the failure of the Johnstown dam, of which a report will be found on another page.

Boston Society of Civil Engineers.

A regular meeting was held May 15, President FitzGerald in the chair, 54 members and 8 visitors present. Mr. Waldo E. Buck was elected a member of the society. A committee on excursions was announced, with Edward W. Howe as chairman. Mr. Tilden, from the Committee on Common Headquarters, made a full report on the practicability of occupying rooms in common with other scientific societies. It was stated that there is a movement on foot for the erection of a building on the Back Bay to accommodate various organizations. If this does not succeed it probably will be thought best for a small number of the societies to unite in purchasing a dwelling house and adapting it to their needs. The committee was continued, with the addition of Mr. Elliott C. Clarke. On the suggestion of Mr. C. Frank Allen the Committee on Excursions was authorized and requested to make announcements at the regular meetings of works of current engineering interest in progress, to the end that members could visit such works at convenient and timely intervals. Mr. John A. Gould, Jr., read a paper describing the high service system of the Boston water-works, with particular reference to the new pumping plant on Chestnut Hill and the new Fisher Hill reservoir. Mr. Charles E. Haberstroh read a paper giving a description of experiments recently made to determine the co-efficient to flow through the large gates used on the Boston water-works.

Engineers' Club of St. Louis.

The 304th meeting of this club was held on May 29, President Meier in the chair, 19 members and 5 visitors present. Mr. P. M. Bruner read a paper on a new system of fire-proof flooring. The system described has been used in the State Capitol at Jefferson City, and is now being applied in some St. Louis buildings. The paper was discussed.

The special order of business was a discussion of Mr. Sedon's paper on "Settling Water." Professor Johnson presented a written discussion criticising some of the methods employed and results secured. Some of the data in the paper he considered of great value. He thought the disturb

ing effect due to the energy of the water on entering the basin and to the effects of the wind were greatly underestimated. Mr. Holeman explained the experiments made by Col. Fladd several years ago, which resulted in unfavorable conclusions as to the plan of continuous settling. The reservoirs of St. Louis could not be cleaned as often as necessary, and were required to do about double the work which they were originally intended for. Other members took part in the discussion.

PERSONAL.

—Mr. John J. Endres, Chief Engineer of Hudson County Elevated Cable Railroad, Hoboken, N. J., died suddenly May 24, at the age of 47.

—Mr. S. D. Burton, Superintendent of the Second Division of the Mexican Central, has resigned that position, and has returned to the United States.

—A Baltimore dispatch states that General Passenger Agent Charles O. Scull, of the Baltimore & Ohio, lost nine relatives in the flood at Johnstown.

—Mr. Frank Bakeman, formerly Business Manager of the *Northwestern Railroader*, has accepted a position with the Hinson Coupler Co. as General Agent.

—Maj. R. A. Bacon, who has been Superintendent of the Rome & Decatur road since its construction, and while it was being operated by the contractor, has resigned his position.

—Charles Butler, Assistant Treasurer, and H. C. Adams, Assistant Engineer of the Cambria Iron Company, lost their lives in the Johnstown flood.

—Mr. Henry C. Nutt, who has been President of the Atlantic & Pacific since 1881, has resigned that office on account of ill health, and has been succeeded by M. J. A. Williamson.

—Mr. McElroy, late with the Phœnix Iron Co., Phœnixville, Pa., is now a member of the firm of Anthony & McElroy, iron and steel commission merchants, 328 Chestnut street, Philadelphia.

—Mr. Walter Morcom, who until recently was General Freight and Passenger Agent of the Mexican National, has accepted a similar position on the Interoceanic road, which is now under construction.

—Mr. William Hainsworth, for many years Superintendent of the Pittsburgh Steel Castings Co., Pittsburgh, Pa., and President of the Hainsworth Steel Co., has resigned both his positions and withdrawn from the firms.

—Mr. James Barker, General Passenger and Ticket Agent of the Wisconsin Central Co., is said to have resigned to accept a similar position on an Eastern road. He has held the position since March 1, 1886.

—Mr. J. M. Ferris, Receiver of the Toledo, Columbus & Southern, has been chosen General Manager of the reorganized company, the Toledo, Columbus & Cincinnati, in addition to his position as General Manager of the Toledo & Ohio Central.

—Mr. George W. Cook, General Western Freight and Passenger Agent of the Missouri Pacific at Denver, has tendered his resignation to become General Agent of the Colorado Coal & Iron Co., at Denver, succeeding W. G. Brown, resigned.

—Isaac R. Westlake, New York Agent of the Virginia, Tennessee & Georgia Air Line, died at his home in Summit, N. J., last week of consumption, aged 38 years. By long years of faithful service Mr. Westlake had become identified with the line. His popularity among patrons and brother railroad men was due to his never-failing courtesy, but more especially to his unswerving adherence to what he believed to be right.

—Mr. Louis M. Cole, General Ticket Agent of the Baltimore & Ohio, died in Baltimore June 4, of paralysis. Mr. Cole was born in Frederick County, Md., 75 years ago. He was said to be not only the oldest officer in the service of the Baltimore & Ohio, but the oldest employé in continuous service of the company. He was first employed in the freight department in 1842, and was promoted to be General Ticket Agent in 1852.

—Mr. F. Broughton, late General Manager of the Great Western of Canada, died June 4 at Eastwood, Ont. Mr. Broughton was General Manager of the Chicago & Atlantic from June, 1884, until November, 1887. He was born in England in 1825, and served on British roads from 1842 to 1875, when he was appointed General Manager of the Great Western of Canada, which position he retained until the line passed into control of the Grand Trunk. After this he held several responsible positions in Canada until 1884, when he was chosen Assistant to the President of the Chicago & Atlantic.

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—The old board of directors was re-elected at the annual meeting in Birmingham, Ala., June 1.

Atlantic & Danville —F. C. Robinson, late General Foreman of the Wabash shops at Danville, Ill., has been appointed General Master Mechanic, with headquarters at Belfield, Va.

Atlantic & Pacific.—At the annual meeting of the stockholders in Boston, May 31, these directors were elected: F. F. Winslow, Jesse Seligman, W. F. Buckley, W. D. Frost, Bryce Gray, Edward H. Pardee, W. B. Strong, B. F. Cheney, Geo. C. Magoun, J. J. McCook, Alden Spear, L. C. Wade and J. A. Williamson. The directors chose as officers the following: President, J. A. Williamson; Secretary and Treasurer, H. W. Gardiner; Auditor, F. E. Hancock; General Manager, Western Division, D. R. Robinson; of the Central Division, H. L. Morrill.

Boston, Concord & Montreal.—The annual meeting of the company was held at Plymouth, N. H., last week, and the following directors were chosen: Edward H. Rollings, Concord, N. H.; Nathan H. Weeks, Plymouth, N. H.; Noah S. Clark, Manchester, N. H.; Samuel S. Kimball, Concord, N. H.; Charles E. Morrison, Boston; Lewis C. Patee, Lebanon, N. H.; Charles A. Busiel, Laconia, N. H.; Hiram N. Turner, St. Johnsbury, Vt. The directors elected E. H. Rollins, President; Nathan P. Hunt, Manchester, Clerk; E. D. Harlow, Boston, Treasurer; Samuel S. Kimball, Concord, Assistant Treasurer.

The Concord road assumed control of the Boston, Concord & Montreal at midnight, May 31. Frank E. Brown has been appointed General Passenger Agent of the system. It is stated that the following appointments have been made: Division Superintendent, E. F. Mann; Superintendent of Construction, W. A. Stowell; Boston Agent, G. R. Storer.

Canada Southern.—The annual meeting of the shareholders of the company was held in St. Thomas, Ont., June 5. Cornelius Vanderbilt, William K. Vanderbilt, James Tillinghast, Anthony G. Dulman, Charles F. Cox, Samuel F. Barger, Sidney Dillon, Joseph E. Brown and Edward A. Wickes were re-elected directors. More than two-thirds of the shareholders were represented at the meeting.

Cape May & Delaware Bay.—These directors and officers were elected at the recent annual meeting: W. F. Russell, Alexander E. Harvey, Chas. H. Mason, John W. Paxson, L. H. Cone, R. P. Russell and Samuel Hendrickson; William F. Russell, President; L. H. Cone, Secretary; J. Henry Edmunds, General Manager.

Central Dock & Terminal Co.—The directors are: George J. Magee, John Lang, Daniel Beach, John Magee, Watkins, N. Y.; C. M. Depew, H. J. Hayden, J. M. Toucey, Theodore Voorhees, New York; S. S. Jewett, J. J. Albright, F. H. Snell, Buffalo, N. Y.; Austin Corbin and A. A. McLeod, Philadelphia, Pa.

Central Ontario.—Robert Fraser has been appointed Superintendent, vice G. W. Dench, resigned. His headquarters will be in Trenton, Ont.

Chicago, Burlington & Quincy.—John T. Douglass has been appointed Traveling Passenger Agent, vice James Young, resigned, and will reportto H. D. Badgley, New England Passenger Agent, 306 Washington street, Boston, Mass.

Chicago, Milwaukee & St. Paul.—The following were elected directors at the annual meeting of the stockholders in Milwaukee, June 1, to serve until September, 1890: Hugh T. Dickey, Peter Geddes, J. Hood Wright, Frank S. Bond, George C. Magoun, August Belmont, Jr., A. Van Santvoard, Samuel Spencer, William Rockefeller and Joseph Milbank, all of New York; Roswell Miller and Frederick Layton, of Milwaukee, and P. D. Armour, of Chicago. The directors who retire besides John Plankinton, of Milwaukee, and J. C. Easton, of LaCrosse, who resigned some time since, are James Stillman and James T. Woodward, of New York. The directors elected the following officers: President, Boswell Miller; Vice-President, Frank S. Bond; Secretary, Peter M. Myers; Executive Committee, Peter Geddes, William Rockfeller and Hugh T. Dickey, all of New York.

Chicago, Rock Island & Pacific.—The annual meeting of the stockholders of the company was held in Chicago, June 5. The old board of directors was re-elected. The only stockholder who opposed this was F. B. Cooley, who voted 18,200 shares.

Chicago & Western Indiana.—This company held its annual meeting in Chicago, June 4. The old board of directors was re-elected with the exception of N. O. Johnson, who was succeeded by V. T. Malott, receiver of the Chicago & Atlantic. The directors re-elected J. B. Carson, President, and B. Thomas, Vice-President and General Manager.

Cincinnati, Wabash & Michigan.—The appointment of V. T. Malott as Receiver of the Chicago & Atlantic was erroneously printed in the *Railroad Gazette* of May 17 under the head of this road. The item on page 349 of that issue gives the facts as they are.

Cumberland Valley.—At a meeting of the directors held recently, William M. Biddle, son of Gen. Edward M. Biddle, was elected Treasurer of the road.

Delaware, Maryland & Virginia.—At the annual meeting in Georgetown, Del., May 29, the following directors were elected: G. B. Roberts, Frank Thomson, R. S. Barclay, S. S. Newhall, T. Ashton, T. D. Powell and John P. Green, Philadelphia; George V. Massey, Dover, Del.; Ebe W. Tunnel, Lewes, Del.; John W. Causey and James M. Hall, Milford, Del.; E. W. Houston, Millsboro, Del.; Senator E. K. Wilson, Hon. George W. Covington and G. W. Bishop, Snow Hill, Md. The following officers have been elected: President, George B. Roberts; Vice-President, Frank Thomson; Secretary, Robert H. Groff, and Treasurer, Robert W. Smith.

Denison & Washita Valley.—At a special meeting of the stockholders in Denison, Tex., May 24, the following officers and directors were elected: W. B. Munson, President; Colgate Hoyt, Vice-president and Treasurer; C. W. Wetmore, Secretary. Directors: Colgate Hoyt, C. W. Wetmore, Charles L. Colby and Charles H. Ropes of New York, and W. B. Munson, Edward Perry, J. T. Munson, J. A. Seaver and J. Cameron, of Denison.

Denver & Rio Grande.—At the annual meeting of the stockholders in Denver, June 3, the following directors were elected: George Coffell, J. T. Welch, R. T. Wilson, C. M. Dacosta, A. English, Edmund Smith and J. R. Rusk, of New York; W. S. Cheeseman and D. H. Moffatt, of Denver.

The jurisdiction of R. M. Ridgeway, Superintendent of the Third Division, has been extended over the Second Division, with headquarters at Salida, Col., relieving C. B. Patrick, Superintendent of the Second Division.

B. S. Josselyn, Chief Dispatcher at Alamosa, Col., has been appointed Car Accountant, with office in Denver.

Denver, Texas & Fort Worth.—F. N. Shelton, formerly Contracting Freight Agent of the Union Pacific at Salt Lake City, has been appointed Traveling Freight and Passenger Agent of this road, with headquarters at Salt Lake City, vice W. L. Wright, promoted to be Commercial Agent at Denver.

Easton & Northern.—The directors and officers are: H. A. Sage, D. D. Wagener, James Smith, Frank Reeder, H. G. Tomblece, Fred. Green, Peter Brady, S. S. Messinger and Jacob Walter and J. T. Knight, all of Easton, Pa. The directors have elected J. T. Knight President, Fred Green Secretary and Treasurer, and Peter Brady Chief Engineer.

Evanston & Salt Lake.—The incorporators of this Wyoming company are: James E. Fulton, Thomas W. Bates of Salt Lake City, and Judge White of Evanston, Wyo.

Harrisburg Terminal.—The directors are: Austin Corbin, of Philadelphia, President; Stephen A. Caldwell, G. deB. Keim, A. A. McLeod, of Philadelphia; George S. Baer, of Reading; James Boyd, of Norristown, and S. P. Wolberton, of Sunbury, directors.

Interoceanic.—Walter Morcom has been chosen General Freight and Passenger Agent. Domingo de Peon is General Superintendent.

La Jara, Pagosa Springs & Western.—The officers and directors of this road are: I. W. Schiffer, President; F. G. Blake, Secretary; James A. Kelly, Treasurer; D. F. Hall, D. E. Newcomb, L. D. Eskridge, A. W. McIntire, I. W. Schiffer, F. G. Blake and James A. Kelly, Directors.

Louisville Bridge Co.—The following officers were elected last week: Charles H. Gibson, President; John E. Davidson, Treasurer; Walter Irwin, Secretary, and W. F. Black, Superintendent.

Louisville, Evansville & St. Louis Consolidated.—The stockholders recently elected the following directors: D. J. Mackey, William Heilman, C. C. Baldwin, Bluford Wilson, G. A. Koerner, E. O. Hopkins, James Stettman, Thomas W. Scott and Edward H. Wangelin. D. J. Mackey was elected President, and W. J. Lewis, Secretary and Treasurer.

Meredith & Conway.—The annual meeting was held at Plymouth, N. H., May 27, at which the following directors and officers were elected: President, Joseph Wentworth; Clerk, B. H. Corning. Directors: Joseph Wentworth, B. A. Kimball; B. H. Corning, Charles A. Busiel, Warren Daniels, Alpha J. Pillsbury, Fred E. Goodall.

Middlebury, Highland & Lake Butler.—The officers are: J. A. Bryan, President; H. Clark, Treasurer, and C. E. Pickett, Superintendent, with office in Jacksonville, Fla.

Middletown, Unionville & Water Gap.—The annual meeting was held in New York last week and the following officers and directors were chosen: Henry Marks, President; James M. Hartshorne, Vice-President; J. P. Rafferty, Treasurer and Secretary. Directors: Charles M. Heald, S. V. White, Simon Borg, Henry Marks, Charles Minzesheimer, R. K. Dow, James M. Hartshorne, Charles V. Ware, Garrett A. Hobart, J. P. Rafferty, Frederic P. Moore, Isaac I. Demarest, Cornelius T. Demarest.

Missouri Pacific.—George C. Smith has been promoted from the position of Secretary to that of Assistant to the First Vice President.

D. M. Lewis has been appointed Wood, Tie and Timber Agent at St. Louis.

Newport News & Mississippi Valley Co.—F. M. Thomas has been appointed General Baggage Agent of the Western Division, with headquarters at Union Depot, Louisville, Ky.

Northern (New Hampshire).—The 45th annual meeting of the company was held in Concord, N. H., May 30. Directors were elected as follows: A. W. Sulloway, G. W. Nesmith, of Franklin; G. E. Todd, of Concord; J. H. Benton, Jr., Silas Pierce, B. P. Cheney and U. H. Crocker, of Boston. The directors organized with Hon. A. W. Sulloway, of Franklin, as President; Hon. W. L. Foster, of Concord, Clerk; G. A. Kettell, Boston, Treasurer; Hon. G. E. Todd, Concord, Assistant Treasurer.

Ohio Valley.—J. W. Terry has been appointed Auditor, with office in Evansville, Ind., to fill the vacancy occasioned by the resignation of Robert Ingraham.

J. Emmett Fleming, of Henderson, Ky., has been appointed Assistant Superintendent of the road.

Oregonian.—Henry W. Goddard has been appointed Superintendent in addition to his duties as Auditor of Freight and Ticket Accounts, with headquarters for the present at Dundee Junction. John McGuire, Superintendent, has resigned.

Pemigewasset Valley.—The following directors were elected at a meeting of the stockholders in Plymouth, N. H., May 27: John J. Bell, Exeter, N. H.; Daniel Saunders, Lawrence, Mass.; Nathan H. Weeks, Plymouth, N. H.; Joseph W. Campbell, Woodstock, N. H.; Daniel Barnard, Franklin, N. H.; John C. French, Manchester, N. H.; Henry Chandler, Manchester, N. H.; John J. Cilley, South Deerfield, N. H.; George W. Hills, Lawrence, Mass.

Peterboro & Hillsboro.—At the annual meeting last week the following directors were elected: J. C. Campbell, of Hillsboro, N. H.; A. W. Sulloway, of Franklin; G. A. Kettell, J. H. Benton, Jr., W. P. Wilson, of Boston; Wyman Pattee, of Enfield; G. E. Todd, of Concord. Mr. Sulloway was elected President; E. H. Woodman, of Concord, Clerk; G. A. Kettell, of Boston, Treasurer; G. E. Todd, Assistant Treasurer.

Pittsburgh, Shenango & Lake Erie.—At the annual meeting of the stockholders and directors of the road, held at Greenville, May 29, the following officers were elected: F. W. Huidekoper, Washington, President; A. H. Steele, New York, First Vice-President; J. T. Blair, Greenville, General Manager; P. E. McGray, Greenville, Secretary; Daniel Moore, Wellsville, O., Treasurer; W. G. Sargeant, Meadville, Purchasing Agent. F. W. Huidekoper, Hon. Henry Rawle, Senator G. W. Delamater, Hon. C. M. Reed, Col. Lewis Walker, A. H. Steele, Hon. W. W. Reed, A. C. Huidekoper, E. S. Templeton, Thomas H. Wells and William I. Bliss, of Cleveland, were elected directors.

Portland, Mount Hood & Eastern.—R. P. Earhart has been chosen President and W. A. Bantz General Manager.

Rome & Decatur.—The following changes have been made: J. R. Taylor, Auditor; H. H. Harris, Master of Transportation; S. T. Cantrell, Roadmaster, with headquarters at Rome, Ga.

St. Joseph Terminal.—W. P. Harris having resigned, J. P. O'Brien has been appointed Superintendent, with headquarters at St. Joseph, Mo.

St. Louis, Alton & Terre Haute.—The annual meeting of the road was held at St. Louis, June 4. Four directors of the second class were elected: Levi Davis, of Alton, Ill.; James A. Eads, of Paris, Ill.; H. H. Beach, of Hillsboro, Ill., and Edward Abend, of Belleville, Ill. The new Board organized by the election of George F. Peabody, of New York, Chairman of the Board, and George W. Parker, of St. Louis, as President and General Manager.

Spokane Falls & Northern.—Mr. H. K. Thurber, of New York, has been elected President of this road.

Suncook Valley Extension.—At a meeting of the directors in Concord, N. H., May 28, J. J. Bell, of Exeter, was elected President and B. P. Cilley, of Manchester, Clerk.

Toledo, Columbus & Cincinnati.—The Toledo, Columbus & Southern having been sold under foreclosure proceedings and purchased by this company it will hereafter be operated under the name of the Toledo, Columbus & Cincinnati. Stevenson Burke is President, J. M. Ferris, General Manager; John F. Cline, Secretary and Treasurer; John Landgraf, Jr., Auditor; Hudson Fitch, General Freight Agent; Moulton Houk, General Passenger Agent, and M. C. Trout, Car Accountant, with offices in Toledo, Ohio. They hold the same respective positions on the Toledo & Ohio Central.

The directors and officers of the reorganized company are: Stevenson Burke, Charles Hickox and Charles J. Hickox, of Cleveland; T. P. Brown, Judge Boyle, A. W. Scott and J. M. Ferris, of Toledo. The board elected the following officers: Stevenson Burke, President; J. M. Ferris, General Manager; John F. Cline, Secretary and Treasurer; John Landgraf, Auditor.

Topeka, Westmoreland & Marysville.—The following are the officers and directors of this company: H. C. Lynn, President; J. W. Fitzgerald, Vice-President; A. B. Pomeroy, Secretary and Treasurer; John R. Mulvane, J. B. Evans, John W. Tmith, J. D. Pattison, A. C. Merritt, Directors, Headquarters, Topeka, Kan.

Vermont & Massachusetts.—The stockholders of the company elected the following directors June 5: D. S. Richardson, Francis Goodhue and George F. Fay, of Fitchburg, and T. F. Ware, Alva Crocker, E. S. Davis and Charles A. Welch, of Boston. D. S. Richardson was elected President.

Wisconsin Central Co.—The company held its annual meeting at Milwaukee, June 1, and the following were elected directors: Charles E. Dyer, Charles L. Colby, Frederick Abbott, David S. Wegg, Howard Morris and Abbot Lawrenee, all of Milwaukee; Charles H. Ropes and Colgate Hoyt, of New York, and Edwin H. Abbot, of Cambridge, Mass. Mr. Joseph L. Colby declined re-election. Charles L. Colby was elected President and Treasurer. Edwin H. Abbot was elected Vice-President and Secretary. The additional office of Second Vice-President was created, and David S. Wegg, General Solicitor, was elected to fill it.

Wyoming, Salt Lake & California.—The officers and directors of the consolidated company are: President, James E. Fulton; Vice-President, L. C. Karrick; Secretary, Theodore Brough; Treasurer, W. P. Noble; other directors, T. W. Bates, J. C. Conklin, Nicholas Treweek, G. O. Noble, Robert Gardiner, J. T. Lynch, W. C. Hall, Nathan Sears, George Mullett, E. E. Rich, J. H. Bacon.

OLD AND NEW ROADS.

New Companies Organized.—Central Dock & Terminal Co.—Easton & Northern—Evanston & Salt Lake—Harrisburg Terminal.

Alabama, Georgia & Florida.—The survey for this road, whose incorporation was noted last week, commenced at Columbus, Ga., June 3, by a party of engineers, who will work south toward Quincy and Tallahassee, Fla. During the summer surveyors will start from one of these points, and proceed north to meet the party surveying from Columbus. C. G. Jordon, of Columbus, is interested in the project.

Atlantic City.—The company is now preparing for a second track between Camden and Atlantic City, N. J., and expects to have 10 miles graded and track laid by July 1. The grading of four miles is now completed, two miles of track is laid and rails are being laid at the rate of one-fourth of a mile per day. The company has bought considerable property in Camden, which gives it a much better line out of the city, and it has replaced a 10 degree curve with a 4 degree. P. McManus, of Philadelphia, is the contractor for the grading and tracklaying. The contract requires the grading to be completed by December 1, 1889, and it is expected that the second track will be in running condition the entire distance by March 1, 1890, at the latest. The new track is being laid with 76-lb. rails made by the Bethlehem Iron Co., with six-bolt angle splice bars. In addition to the purchase at Camden the company has recently purchased a large amount of property at Atlantic City, for terminal facilities, and now has in course of erection a large passenger station, with necessary platforms, train-sheds, etc. The train-sheds and depot cover a space 200 by 500 ft. During the past winter and spring a large amount of work has been done on the present track cutting down summits, raising embankments and cinder-ballasting the roadbed. The company expects in the near future to make its express train schedule 60 minutes between Camden and Atlantic City, 54 miles. Its new engines are capable of hauling a train of seven coaches at a speed of 75 miles per hour, a portion of them having already been speeded to a mile in 44 seconds. The Union Switch & Signal Co. has just completed an interlocking plant at the yard at Kaighn's Point, Camden, covering the entire yard system.

Atlantic, Gulf & Havanna.—It is expected to begin tracklaying very soon on the first 10 miles of this road from St. Augustine, Fla., which has been graded for some time. S. J. Fox, of Port Orange, Fla., has a contract for work on the road. The line is located from St. Augustine to Daytona, and the preliminary survey has been made to the crossing of the St. John's River, near De Land. Tampa Bay is the proposed terminus. The road will pass through the "Hummock Lands," the most fertile section of the state, and through the centre of the orange growing region. D. D. Rogers, of Daytona, is Chief Engineer.

Baltimore & Drum Point.—About 45 miles of this road is now graded ready for cross ties and rails, and work is now in progress. The road is being built south from Baltimore, through Anne Arundel and Calvert counties to Drum Point, on Chesapeake Bay, a distance of 80 miles. At Millersville about eight miles of road is graded, at Davidsonville, 10 miles, and about 27 miles in Calvert County. Nicholas Goldsborough, 10 South street, Baltimore, is Chief Engineer; and Oliver W. Barnes, 57 Broadway, New York, is Consulting Engineer.

Belleville, Centralia & Eastern.—The work of clearing the right of way will begin in a few days. Oliver Ferguson & Co., of Bedford, Ind., have the contract for grading and tracklaying. The road is to extend from Mount Vernon, Ill., to Belleville, 67 miles, and will connect the Louisville, Evansville & St. Louis connection with the Illinois & St. Louis, which has a line into St. Louis. These three roads are under the same management as the Evansville & Terre Haute.

Canadian Pacific.—The first passenger train over the new line across the state of Maine passed over it June 3.

The statement of the company for the month of April shows gross earnings of $1,137,427; Jan. 1 to April 30, earnings of $4,008,034; operating expenses, $733,245; Jan. 1 to April 30, $2,938,673; net, $404,182; Jan. 1 to April 30, $1,069,361. Net increase over April, 1888, $154,503; aggregate net increase from Jan. 1 to April 30, 1887, over same period last year, $581,481.

Canada Southern.—At the annual meeting this week resolutions for the acquisition of the Erie & Niagara and the Leamington & St. Clair roads were unanimously passed.

Central Dock & Terminal Co.—This company has been chartered in New York and Philadelphia by officers of the New York Central & Hudson River and Philadelphia & Reading roads to build a steam railroad, commencing at a point on the shore of Lake Erie, near the foot of Georgia street, in the city of Buffalo, thence northerly parallel with the line of the Niagara Falls branch of the New York Central & Hudson River road to a point north of Dearborn street, thence easterly and connecting with the belt line of the same road, thence along the belt line to Girder street, thence easterly into the town of Cheektowaga and connecting with the main line and yard of the New York Central & Hudson River, a distance of 5¾ miles. The capital stock is $500,000.

Central New England & Western.—This company is being formed to include in one company the Poughkeepsie Bridge system of roads. The termini of the new company will be Campbell Hall, N. Y., on the west, and Springfield and Hartford on the east. The companies included will be the Hudson Connecting, the Poughkeepsie Bridge Co., the Poughkeepsie & Connecticut, the Hartford & Connecticut Western, and the Springfield & Connecticut. An issue of $2,500,000 fifty-year 6 per cent. bonds will be made, covering the entire property. For these bonds the company will receive bonds which are a lien on separate portions of this property. These are $800,000 Hudson Connecting, $800,000 Poughkeepsie & Connecticut, $900,000 Hartford & Connecticut Western. John S. Wilson is President of the consolidated company, as he is of the separate roads.

Chicago, Milwaukee & St. Paul.—At the annual meeting in Milwaukee, June 1, the plan for refunding the bonded indebtedness of the road with a 100-year 4 per cent. bond was presented to the stockholders and approved by them, as it also was by the new board of directors at their meeting.

The following is the statement for April and the four months ending April 30:

	1889.	1888.	Inc. or Dec.
April:			
Gross earnings	$1,819,531	$1,825,698	D. $6,167
Oper. expen.	1,340,759	1,482,894	D. 142,135
Net earnings	$478,771	$342,803	I. $135,967
Four months:			
Gross earnings	$7,171,946	$6,785,696	I. $386,249
Oper. expen.	5,120,985	5,789,582	D. 668,597
Net earnings	$2,050,969	$996,113	I. $1,054,817

The net earnings in April, 1887, were $646,426; 1886, $553,265; 1885, $820,714. The average for these three years was $673,401, against $478,771 in 1889.

Cincinnati, Alabama & Atlantic.—The directors have authorized a mortgage for $7,000,000 on the road from Huntsville, Ala., to Somerset, Ky.

Cleveland, Akron & Columbus.—Kissner, Cook & Co. are grading a three-mile branch of this road from near Akron, Ohio, to a coal mine, and will have it completed about July 1. It is intended to extend the branch in the future to Turkey Foot Lake, an excursion resort.

Cleveland, Columbus, Cincinnati & Indianapolis.—The suit instituted at Cleveland by Judge Stevenson Burke, to prevent this company from consolidating with the Cincinnati, Indianapolis, St. Louis & Chicago, was decided this week by Judge Stone in favor of the defendant. He denied all of Judge Burke's propositions, save one, and held that the necessary physical connections existed, that the "Bee Line" and "Big Four" were not competing lines, and that the consolidated company may legally have more stock than the aggregate of the old companies. He held it a serious question whether preferred stock should be granted superior powers over common stock by a controlling board of directors, and said the danger was so remote that the court would not be justified in interfering. The danger could be remedied when it presented itself.

Columbus, Hocking Valley & Toledo.—At Toledo last week a decision was rendered in the case of Judge Stevenson Burke against this road. Judge Burke received judgment for the full amount, $200,000, against the company. When the company first got the injunction restraining Burke from selling the bonds given him, it gave two separate bonds of $100,000 to cover the damages that might result. Judge Burke, in his petition, claimed that he could have sold $300,000 of the stock, but during the trial the stock depreciated, making a loss of $200,000.

Concord.—The annual meeting of the stockholders of the road was held in Concord, N. H., last week. A motion declaring that the contract made by the directors to operate the Boston, Concord & Montreal was detrimental to the interests of this company, and instructing the directors to take measures to set it aside, was rejected. There is also a minority of stockholders in the Boston, Concord & Montreal opposed to the road being leased or operated by the Concord or any other road.

Decatur City Southwestern.—This company has been organized in Iowa, by B. F. Folsom, of Des Moines, and others, to build a railroad from that city southwest to the Missouri line.

Denver, Utah & Pacific.—This road, which is controlled by the Burlington & Missouri River, and which extends from Denver northerly to Lyons, Col., 43 miles, with short branches, is to be changed to standard gauge. It is claimed that the work will be completed in two months.

Detroit, Wabash & Chicago.—This company which proposes to build a road 10 miles long from Wabash, Ind., to Laketon Junction, connecting the Detroit division of the Wabash with the main line, has just been voted a subsidy of $45,000 by Wabash township.

Easton & Northern.—This company has filed a charter in Pennsylvania, with a capital stock of $200,000, to build a road from Easton along the Bushkill Valley to Ashland, Northampton County, 10 miles. James W. Smith, of Easton, has already been given the contract.

Empire & Dublin.—On the extension of this road east 19 miles to Dublin, Ga., about 200 convicts are at work, and track has been laid for a distance of 12 miles. The extension west from Empire to Hawkinsville, Ga., 12 miles, will also soon be completed. The road is owned by the Empire Lumber Co., and bonds have been issued to pay for the cost of the extensions.

Evanston & Salt Lake.—Charter filed in Wyoming to build a road from Evanston, 22 miles, to a connection near the Utah border with the eastern terminus of the proposed Wyoming, Salt Lake & California road. The grades are light, the maximum being 1¼ per cent., with an average of 45 ft. The estimated cost of construction is $12,000 per mile, and construction will, it is claimed, begin as soon as the surveys are completed. The capital stock is $500,000.

Fort Worth & Rio Grande.—Tracklaying on the extension from Granbury, Tex., has been begun, and the 28 miles now graded will soon be finished.

Freehold & New York.—S. B. Oviatt, of Asbury Park, N. J., has been awarded the contract for grading and bridging on the extension from Lorillard, N. J., to Hopping Junction, a distance of four miles. He expects to have the roadbed ready for track-laying by July 15. The money to build the line is supplied by the Central of New Jersey, in connection with which road and with the Freehold & New York the new line will be run. This four miles of road and the recent extension from Keyport to Lorillard, 2½ miles, connects the Long Branch Division of Central of New Jersey with the New York & Atlantic Highlands and forms a new and short line to Atlantic Highlands, Navesink and Leonardville, giving through train service to that region, instead of the circuitous line, involving change of cars via Red Bank, which at present constitutes the all-rail route to and from New York.

Georgia Pacific.—The company has opened for business 14 more miles of its western extension in Mississippi, between Mabin and Euporia. Three new stations have been established. This makes 58 miles of the extension that has been opened west of Columbus and is now being operated. There are about 82 more miles to Greenville, which is being completed rapidly, and will all be completed early in July.

The company has secured running rights from Greenville, Miss., to Arkansas City over the Louisville, New Orleans & Texas. The construction of the independent line to Arkansas City which has been contemplated will, therefore, be abandoned.

Gouverneur & Southern.—Organized at Gouverneur, St. Lawrence County, N. Y., with a capital of $250,000, to build a road from Gouverneur south along the Oswegatchie River to the village of Fine, a distance of 25 miles. The preliminary survey was made in 1887 and the locating survey has been made for part of the line. The right of way has been partly secured and it will probably soon be all obtained. The location will also be soon finished, and it is expected to begin clearing early in July. Walter F. Randall, of Oneida, is Chief Engineer.

Harrisburg Terminal.—Charter filed in Pennsylvania by officers of the Philadelphia & Reading to construct a road from Bowmansdale in Cumberland County to the Susquehanna River, thence by a bridge over the Susquehanna River to the City of Harrisburg, and thence through Harrisburg to a point in the city on the line of the Lebanon Valley Branch of the Philadelphia & Reading, about nine miles. The capital stock is placed at $500,000.

High Point, Randleman, Asheboro & Southern.—Tracklaying on this road between High Point and Asheboro, N. C., a distance of 26 miles, was completed last week, and the line will probably soon be opened for traffic. A further extension of the line is under consideration.

Houston, Central Arkansas & Northern.—Tracklaying on this road has now been completed from Monroe south toward Columbia, La., for a distance of 20 miles. The section to Columbia will be opened for traffic early in July. An effort is being made to induce the company to build via Marksville and New Iberia to Morgan City, La., making that point a terminus instead of Houston, Tex., as at present proposed.

Kentucky Midland.—The road is completed and has been opened from Frankfort east to Georgetown, Ky.

Knoxville & New River.—The company has under consideration a project for changing the gauge of the road from 3 ft. to standard to accommodate an increased and heavy tonnage expected from the development of coal fields on and along the road. From Robbins, Tenn., to Leakes Mill several changes in the alignment and grades will be made.

La Jara, Pagosa Springs & Western.—This company has been formed at La Jara, Col., and a survey is being made from La Jara to Pagosa Springs. Several branches to coal fields are projected.

Louisville, Evansville & St. Louis Consolidated.—At recent meetings of the stockholders of the Belleville, Centralia & Eastern, Illinois & St Louis, Louisville, Evansville & St. Louis, Venice & Carondelet and Huntingburg, Tell City & Cannelton companies, the consolidation under the above name was ratified. The capital stock of the new company amounts to $5,790,747, of which $1,300,000 is preferred stock and $3,790,747 is common stock. The certificate of organization has been filed in Illinois. It is proposed to create a consolidated 5 per cent. mortgage, dated Jan. 1, 1890, and drawing interest from that date. The bonds provided under this mortgage will be sufficient in amount to retire all present issues, to pay for the construction of the Belleville, Centralia & Eastern, and to provide for retiring the present second mortgages of the old Louisville, Evansville & St. Louis. These seconds will be retired on the following terms: The new consols will be offered at 80 to holders of the seconds, and the seconds will be accepted at 60 in payment. That is, a holder of four seconds turns them in and gets back three consols.

Louisville & Nashville.—A press dispatch states that the company will make improvements in the shape of double track this summer which will cost $500,000. The most important part of this improvement is the construction of a double track between East Louisville and Anchorage, 12 miles; a double track between Louisville and Shepherdsville, 15 miles, and from East Nashville to Edgefield, 9 miles; from Birmingham, Ala., to Graves, 5 miles, and from Birmingham to Boyles, 3 miles.

A corps of engineers is now locating the line from the southern portal of the Cumberland Gap tunnel to the connection with the Norfolk & Western at Norton, Va., and the work of construction has already been begun.

Louisville, New Albany & Chicago.—The work of laying the independent track of the road from Howland's station to a connection with the joint tracks of the Lake Erie & Western and Cleveland, Columbus, Cincinnati & Columbus roads at Massachusetts avenue, in the city of Indianapolis, was commenced last week and will be completed in about two weeks.

Louisville Southern.—On the line between Lexington and Lawrenceburg, Ky., 24 miles, tracklaying is in progress and will soon be completed. The grading is finished.

Lynchburg & Durham.—This road, which is building from Lynchburg, Va., south to Durham, N. C., 115 miles, is now in operation to Winfall, Va., about 15 miles from Lynchburg. Tracklaying has been completed for 5 miles more, and this will be opened for business as soon as it is ballasted and surfaced. Carrington & Reily, of Lynchburg, have the contract for all work in Halifax County, and Codwise & Allen all the rest to Durham. The work is to be pushed to completion as soon as practicable, and will be finished in November. There are quite a number of bridges on the line of minor importance, except the one at Staunton River, which has three spans of 152 ft. each.

Maine Central.—On the extension from Fabyans to Scotts Mills, Me., a distance of 16½ miles, track has been laid to Z aland, about 3 miles. The entire line has been located and the work is being done by the forces of the company, no contractors being employed. About 500 men are at work on the road.

Maryland Central.—A mortgage deed on all its property from this company to the Mercantile Trust & Deposit Co. of Baltimore, for $7,000,000, to secure the payment of bonds and interest to be issued for widening the gauge of the road, completing connections with the York & Peach Bottom road, and constructing the Deer Creek & Susquehanna, has been filed for record in the Superior Court in Baltimore. The bonds are to be payable in 1903 and are to bear five per cent. interest.

Maryland Midland.—The incorporators have contracted with Ryan & McDonald, of Baltimore, for the building of the road. It will leave the Green Spring Branch of the Northern Central at a point between Rogers' Station and the junction of the Western Maryland, and will pass through The Caves Valley and Worthington Valley in the direction of Beckleysville and Hoffmansville. It will be about 25 miles in length. The road is to be operated by the Pennsylvania.

Marysville, Sutter City & Colusa.—The surveys between Marysville and Sutter City, Cal., will soon be completed. A small force is now grading, about four miles being completed.

Melbourne & Atlantic.—This short Florida road extending from the Indian River near Melbourne to the Atlantic Ocean has been completed and will soon be put in operation.

Middleburg, Highland & Lake Butler.—Bryan, Pickett & Clark, of Jacksonville, Fla., have the contract for building 11 miles of this Florida road and are now building from Middleburg northwest to the connection with the Florida Central & Peninsular at Highland. The survey has not yet been made beyond Highland, but it is intended to build west from that point. It has not yet been decided when work will be commenced. The ownership of the road has recently been changed, and it is now owned by the same interest that controls the Jacksonville & Atlantic Transportation Co. This company runs daily steamers on the St. Johns River between Jacksonville, Mayport and Fort George Island. The steamers connect with this road at Middleburg and at Jacksonville with all steamship and railroad lines converging there.

Minneapolis & St. Louis.—The sale of this road, now in the hands of Receiver W. H. Truesdale, by the United States Master in Chancery, to satisfy the claim of bondholders, is expected to take place at Minneapolis during the June term of the United States Court. It is rumored that the road may be purchased by the Minneapolis, St. Paul & Sault Ste. Marie.

Missouri, Kansas & Texas.—Judge Brewer has authorized the Receivers to complete the Dallas extension from Lancaster to Waxahachie, Tex. The Union Trust Co., of New York, recently petitioned that the Receivers be restrained from expending in improvements on divisions funds which were not earned on that division. The mortgage held by the Union Trust Co. covers that part of the line north of Denison and the Mercantile Trust Co.'s mortgage south of Denison. The petitioners claim that the line north of Denison has the greatest earning power and that the surplus from these earnings should be expended on this part of the line. The Receivers have considered the two divisions as one, and have made renewals and repairs where they were most needed, but have kept the accounts separate, leaving the settlement of the affair to the two trust companies. The Receivers contend that the surplus earnings above operating expenses should be expended without reference to the respective mortgage divisions, or the amount earned by any one division, on the ground that the Receivers must perform this duty to keep the whole and every part of the line, without reference to divisional mortgages, because failure to do so might entail the sacrifice of the franchise of the whole to the detriment of the very division which regarded itself as prejudiced by the acts of the Receiver.

The statement of expenditures between Nov. 1, 1888, and May 7, 1889, recently filed, shows that on the Southern division, south of Denison, $573,688 has been expended, while on lines north of Denison the sum is $218,196. An additional sum of $143,275 has been expended for the good of the entire system. The following are some of the largest items in the expenditure: The construction of the Dallas & Waco extension, $127,286; 15,000 tons of steel rails, $45,000 to Southern division and $450,000 to Northern division; fifteen mogul engines, $120,000.

The statement of the earnings of the road, by divisions, for the quarter ending March 31, shows:

	Earnings	Expenses.		Net.
M., K. & T., North Div.	$609,487	$429,506	I.	$170,981
Han. & Cent. Mo. Div.	67,870	71,998	D.	4,127
Tebo & Neosho Div.	166,174	84,152	D.	82,022
U. P. S. Branch Div.	79,190	101,563	D.	22,373
M., K. & T., Tex. Div.	470,388	638,499	D.	168,111
East Line & Red River Div.	38,632	86,204	D.	47,572
Trinity & Sabine Div.	27,020	49,089	D.	22,069
Rental Osage Div.	9,999	*146,310	D.	136,311

* Taxes account M., K. & T.

Missouri Pacific.—On the connecting line between Coffeyville, Kan., and Wagoner, I. T., 82 miles, the track laying is now completed for a distance of 27 miles from Coffeyville. Tracklaying is not now in progress, but it will probably be resumed this month. E. P. Reynolds & Co., of Wymore, Neb., have the contract for grading and track laying on the entire line.

Monterey & Mexican Gulf.—Tracklaying is now completed south from Monterey, Mex., for a distance of 36 miles, and the road is open for traffic to Cadereita, 23 miles from Monterey. It is expected to complete the line to Montemorelos by July 1 and to reach Linare early in the autumn.

National City & Otay.—Engineers are surveying a 12-mile extension east from the present line to the Jamul Valley.

New Roads.—Citizens of Greenfield, Ind., are agitating the building of a road from Greenfield to Anderson, a distance of 20 miles. Such a road would connect some of the most important lines in the state.

New York, New Haven & Hartford.—The Senate of the Connecticut Legislature has passed the bill authorizing the company to increase its capital stock $35,000,000, provided that it shall not exchange its capital stock for the obligations of any railroad wholly outside of Connecticut.

Ohio & Mississippi.—The company is said to have offered to extend the road from Cypress Junction, Ill., on the Ohio River, to a point opposite Paducah, Ky., provided that city makes a subscription of $100,000 to aid in its building.

Oregon & Washington Territory.—It is expected to finish the tracklaying by July 1 on the Pendleton extension from Fulton, Ore., to Pendleton, Ore., a distance of 7 miles.

Owensboro, Falls of Rough & Green River.—Tracklaying has been commenced on this road at Owensboro and will soon be completed to Fordsville, Ohio County, Ky. The grading has been finished to Fordsville, and will probably soon commence on the section between that point and Litchfield, Ky.

Pennsylvania.—The Philadelphia Councils' Committee on Railroads has decided to favorably recommend the passage of the ordinance granting permission to the company to lay tracks to connect its Delaware extension with League Island, in the Delaware River. The ordinance provides that the new branch shall begin at 25th and Bigler streets and run to a point near Delaware avenue and 37th street, and then north to connect with the tracks of the company.

Peru & Detroit.—The company has just been voted $40,000 by the city of Peru, Ind., to aid it in building its road from Peru northeast to Laketon on the Wabash Western, 25 miles.

Philadelphia, Wilmington & Baltimore.—The company has decided to lay a third track to accommodate increased traffic from Gray's Ferry to Moore's Station, Pa., a distance of about six miles. The report recently circulated that the company would soon build a four track road between Philadelphia and Baltimore is untrue. There has not even been an estimate for such a thing.

Quebec Central.—The company is preparing specifications for the extension from the present terminus at St. Francis, Que., to the Maine boundary, about 14 miles, and tenders for building the line will soon be asked. The money for building the road will be raised by the issue of prior lien bonds, which was sactioned by Parliament in 1886. Frank Grundy, of Sherbrooke, Que., is General Manager.

Rockaway Valley.—The work of building the extension of this road from New Germantown, the present terminus, to Pottersville, N. J., four miles, has been let to John P. Brothers, and grading has been started. The work is to be completed by Sept. 1, next. The right of way has been all secured. The extension to Peapack will soon be put under survey, and it is expected to have it built by next winter. The line will then be 12 miles in length, through a rich fruit and farming county, and heavy lime and cement beds of first quality, which now have no railroad outlet.

Rome & Carthage.—The locating survey for this road is now being made between Rome and Carthage, N. Y., about 70 miles, and has now reached Constableville, a point about 25 miles north of Rome. The route passes through an excellent lumber and dairy country hitherto unsupplied with railroad communication. James C. Smith is President and A. W. Orton is Secretary, both of Rome.

St. Louis & Chicago.—The coal branch of the road from Litchfield to Mount Olive, Ill., which was alleged to have been sold without the knowledge of a majority of the directors or stockholders for the purpose of depriving the St. Louis & Chicago bondholders of their first lien on that road, has been returned to the company. It is a valuable part of the road, as it controls much of the coal business for the entire line.

Savannah & Western.—The company is filing in Alabama a copy of a mortgage for $18,000,000, made in favor of the Central Trust Co., of New York. The mortgage is to secure an issue of five per cent. bonds of equal amount. The bonds, among other things, are to pay off the indebtedness and all obligations incurred by the company in building the Columbus & Western road from Columbus to Birmingham.

Spokane Falls & Northern.—On the section from Spokane north to Colville, Wash. Ter., 50 miles, grading has been completed. Tracklaying has been commenced at Spokane Falls, and is being pushed at the rate of about a mile a day. It is expected to open this section of the road early in August. Money has already been provided for the construction of the road. The securities have been disposed of, and all work and material are being paid for in cash. D. C. Corbin, of Spokane Falls, is the contractor. The main line of the road will extend from the city of Spokane Falls to a point on the Columbia River at or near Little Dalles, W. T., a distance of about 117 miles.

Tampa & West Coast.—C. T. Taylor, E. R. Davis, C. F. Wall and others have organized this company in Florida to build a railroad from Tampa to or near Sutherland, Hillsborough County, on the Orange Belt road.

Toledo, St. Louis & Kansas City.—The work of changing the gauge of the road to the standard was completed last Sunday, the western division being changed on that day. The contract of the construction company called for the completion of the work by July 4, but its earlier accomplishment has been secured by vigorous action. Through train service will begin as soon as the delivery of the new equipment can be made. The entire road from Toledo, southwest to East St. Louis, is now of standard gauge.

Union & Northwestern.—Engineers are now in the field surveying this proposed road from Monroe northwest to Farmersville, Union County, La., a distance of about 25 miles. The survey will probably be continued to Camden, Ark. C. G. Woodbridge, of Monroe, La., is Chief Engineer.

Wabash.—Judge Gresham has entered an order confirming the recent sale of the Wabash lines and instructing that a transfer of the property be made to the purchasers upon their application. The first steps in the formation of the new consolidated company have been taken by the Purchasing Committee by incorporating companies in Ohio, Indiana, Michigan and Illinois. The Illinois company is known as the Wabash Eastern of Illinois. The capital stock is $12,000,000, all held by the Purchasing Committee except one share by each of the directors. The Indiana company was incorporated with a capital stock of $9,000,000, all held by the Purchasing Committee, with the exception of enough to qualify directors. An Ohio company has been organized under the name of the Toledo & Western with a capital stock of $700,000, and the company to which the Michigan line will be transferred is the Detroit & State Line Wabash Railroad. The lines in each of the several states will be transferred by the Purchasing Committee to the company organized in each state, and all those companies, including the Wabash Western, will be consolidated under one management. The capital stock of the consolidated company will be $52,000,000. Of this $24,000,000 will be preferred and $28,000,000 common stock. The preferred will receive 7 per cent. dividends before the common will be entitled to any. This new stock will be issued to the holders of the stock of the old Wabash, St. Louis & Pacific deposited under the reorganization plan. The new company will also issue $35,000,000 first mortgage bonds, $14,000,000 second mortgage bonds, and $30,000,000 debenture bonds. The second mortgage is to contain a clause under which foreclosure rights shall be waived until six months after continuous default in the payment of two coupons. The debentures are to draw 6 per cent. if the earnings are sufficient, the interest not to be cumulative. The debentures have voting power and are practically nothing more than a preferred stock. Taxes and interest on the first mortgage bonds will require the net earnings to reach about $2,850 000. The net earnings in 1887 were $3,955,688 and in 1888 $2,554,365. The second mortgage bonds will require $700 000 interest. The interest on the debentures will be $1,800,000. Then before the preferred stock can look for dividends $5,350,000 must be provided by net earnings, and before the common stockholders can look for any return $1,580,000 more than that amount must be provided for dividends on the preferred stock. That is, common stock can only receive dividends out of the surplus over $6,930,000 in net earnings. Net earnings were 57 per cent. of that amount in 1887, and 37 per cent. of it in 1888. The net earnings of the whole system for the first four months of this year are $4,511,377 against $4,389,826 for the corresponding period of 1888, an increase so small as to make it a question if even the first mortgage interest is fully earned this year.

Weston & Elk River.—The surveys for this West Virginia road are still in progress but will soon be completed, and the company expects to let the contracts for building the line in August. The road is to extend from Weston southeast to Braxton C. H. 42 miles. Thomas Pettigrew, of Parkersburg, W. Va., is Chief Engineer.

Wyoming, Salt Lake & California.—The consolidated articles of association of the Wyoming, Salt Lake & California and Salt Lake, Nevada & California roads have been filed in Utah. The new corporation takes the name of the former road, with a capital of $10,000,000. The shares of the old companies are exchanged for the new, share for share. The proposed line is 236 miles long, and has been fully described in these columns.

TRAFFIC.

Traffic Notes.

The general freight agents of fifteen roads in Northern Illinois have organized an Illinois State Rate Association.

The Cleveland, Columbus, Cincinnati & Indianapolis will on and after July 1 sell tickets on Sunday between all stations on its line at one fare for the round trip.

The Inter-state Commerce Commission met in Jefferson City, Mo., last week, to hear the demands of certain shippers that the Chicago & Alton shall carry live stock by the carload regardless of weight.

The Southern Pacific has given informal notice of withdrawal from the Transcontinental Association, alleging that the Canadian Pacific is securing an unjustly large share of the Pacific Coast traffic with the east.

The Chicago, Burlington & Quincy has replaced some of the local trains taken off last winter. The Union Pacific has reduced the train service on the Cheyenne & Northern from a daily to a tri-weekly service.

Governor Larabee, of Iowa, has sent out a circular of inquiry to shippers and others embodying a half dozen questions concerning freight rates and the views of the recipients as to what action the state should take in the future.

The Omaha & Grant Smelting Company, of Denver, last week gave a bond for $5,000 and secured an injunction compelling the Union Pacific to switch cars of ore to and from its yard. The road had refused to move these cars to and from competing lines except upon a large increase in compensation.

The Canadian Pacific, which controls the Minneapolis, St. Paul & Sault Ste. Marie has put on a daily through train, with dining car, between Montreal and Minneapolis, and a daily through sleeping car between Boston and Minneapolis. The connection with Boston is over the Boston & Maine, *via* Concord, N. H., and the time between Boston and Minneapolis is about 60 hours.

The Southern Railway and Steamship Association has adopted an innovation in the shape of a car load rate on boots and shoes, lots of 10 tons or over being put in second class after July 1. The change in Southern rates, alluded to in another column, is accompanied by a considerable advance in freight tariffs from New York to Natchez, Vicksburg and other Mississippi River towns. Via New Orleans the new rate will be on the basis of 85 cents per 100 lbs, first-class, the present rate being 55 cents. By direct rail lines the first class is $1.

The New York, Pennsylvania & Ohio has made reductions in rates on iron (averaging 10 per cent. on pig and 20 per cent. on manufactured iron) from Eastern Ohio and Western Pennsylvania districts, to all points West. The Central Traffic Association had refused to authorize this reduction and the road has now acted independently. At a meeting in Toledo on Monday of this week representatives of the other roads resolved to meet the reduction. Rates by the carload were agreed upon as follows: Youngstown to Chicago, 9 cents; Toledo to Chicago, 7 cents; Cleveland to Chicago, 8 cents. It is said that the rates from Pittsburgh will be at once reduced to correspond.

Indicted for Violating the Inter-state Commerce Law.

Indictments were found by the Federal Grand Jury, at Chicago, last week, against the following officers of the Michigan Central: Alexander Mackey, General Freight Agent; Arthur W. Street, Assistant General Freight Agent; Watson P. Griswold, Contracting Freight Agent; F. C. Nicholas, Local Freight Agent, and Edgar L. Somers, Agent of the Blue Line. These men are accused of violating the law in arranging with Counselman & Day, of Chicago, for the transportation of grain from Chicago to New York at special rates without proper notification to the Inter-state Commerce Commission. The penalty in case of conviction is a fine not exceeding $5,000. The law imposing imprisonment as a punishment for this class of offenses was enacted since this case occurred.

The facts in this case, reported in the *Railroad Gazette* for Dec. 21 last, will be recalled. Counselman & Day, who are owners of elevators at points west of Chicago, on the Chicago, Santa Fe & California, were allowed to ship from Chicago elevators to New York at about 18 cents, the Michigan Central proportion of rates on grain originating at points west, which was about two cents less than the published rate from Chicago. This was accomplished by means of blank shipping bills, which got into the hands of Counselman & Day, who filled them out to appear as if the grain had originated at a western point. It is now understood that these blanks were furnished by Contracting Agent Griswold, though the entire blame for the transaction was put upon Mr. Street, who suffered dismissal from the company's service. He has hitherto refused to divulge the particulars of the transaction.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all lines for the week ending Saturday, June 1, amounted to 38,409 tons, against 41,198 tons during the preceding week, a decrease of 2,789 tons, and against 34,114 tons during the corresponding week of 1888, an increase of 4,295 tons. The proportions carried by each road were:

	W'k to June 1.		W'k to May 25.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	4,113	10.7	3,848	9.3
Wabash	3,951	10.3	4,104	10.0
Lake Shore & Michigan South.	5,734	15.0	5,653	13.7
Pitts., Ft. Wayne & Chicago	5,334	13.9	5,779	14.
Chicago, St. Louis & Pitts.	4,724	12.4	5,378	13.
Baltimore & Ohio	2,315	6.1	2,546	6.
Chicago & Grand Trunk	5,898	15.2	6,078	14.
New York, Chic. & St. Louis	2 090	5.3	2,609	6.
Chicago & Atlantic	4,250	11.1	5,203	12.
Total	38,409	100.0	41,198	100.0

Of the above shipments 1,615 tons were flour, 8,616 tons grain, 1,970 tons millstuff, 4,070 tons cured meats, 1,741 tons lard, 9,125 tons dressed beef, 33 tons grass seed, 1,771 tons butter, 1,069 tons hides, 172 tons wool, and 6,021 tons lumber. It is rather an unusual coincidence that the grain shipments for two consecutive weeks should be exactly alike, 8,616 tons. The three Vanderbilt lines carried 31.0 per cent., while the two Pennsylvania lines carried 26.3 per cent.